The Builder.

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Swedish Granites.

NO country in Europe is richer in granite and crystalline rocks of a kindred nature than Sweden, and the influence of the granite industry of that kingdom is felt in all countries bordering the Baltic and North Sea. Thus Scandinavian granite has found its way into the British market, and is now a common feature, both in Aberdeen and London; and competition has become so keen that kerbing and pitching no longer pay the Scotch and Cornish granite-merchants as they used to do. Small blocks which once were used up for these purposes, have now too often to be thrown aside on the rubbish-heap. Not only is one of the once most profitable branches of the trade brought to the dead level of keen foreign competition, but the cartage of the stone from the face of the quarries to the rubble-heaps has enormously increased the working expenses, whilst the accumulation of the waste material is a positive hindrance, in many instances, to the future development of the quarries. From this it will be readily understood that where the waste, when worked and dressed, can be sold at a good profit, the quarry-owner is able to turn out ordinary blocks for polishing and engineering at much lower rates than otherwise,—in fact the cost of the stone can be reduced all round. Certain contractors working their own quarries are, by their large capital and influence, or by the favourable situation of their workings, enabled to secure much of the trade, and even kerbing and pitching are said to be profitable in their hands. To the average granite merchant, however, the small margin of profit on the latter, if any, is barely worth troubling about; a local trade is done, but that is all. The introduction of wood-paving and asphalte has also lessened the demand for pitching.

In spite of all this, however, there is still an enormous trade in granite, and it is impossible to shut our eyes to the fact that there is now a greater tendency to extensively employ the material for building and engineering purposes than there has ever been before. Whereas a few years ago it was a rarity to see the stone used in London edifices, it is now a common building material in the metropolis, and so far the granite used is mostly British. Here and there, however, the foreign stone may be found, and from information recently at hand we think it likely that it will shortly force itself still more into public notice. Our insular prejudices make us believe that there is no granite so durable and capable of being polished as British, and it is fondly hoped in certain quarters, that this element will enable our material to hold its own against all comers. This is entirely a delusion. There are bad foreign granites as there are also inferior British kinds, and both find a ready sale from their cheapness; but there are granites in the Scandinavian peninsula, in Finland, and in Brittany, which are quite as handsome and durable as any that have ever been sent out from Aberdeen, Peterhead, or Penryn, and many of the former kinds are landed and sold in Great Britain at a fair profit.

Hitherto, although her sister country, Norway, has had a large share in the competition, Sweden has only made herself felt, principally in North Britain; but now she is coming south. Not content with supplying the major part of the paving material of Berlin and Copenhagen, she is ambitious to furnish the English metropolis also with granite, both rough and polished. Many Swedish merchants have some idea of the nature, situation, and extent of British granite quarries, and the methods adopted in quarrying and polishing the stone here. Even if all this were not already known to them, they now have ample opportunity of obtaining information on the subject, as we shall see. The Swedish Government, through its Geological Survey, has instituted minute inquiries in this country respecting our granite industry. This, we believe, is at present only known to about half-a-dozen people in England. Well aware of the assistance science is able to afford industry in a matter of this kind, that Government last year sent a practical geologist here to thrash out the subject. The series of articles on British granites that appeared in our "Student's Column," under the heading of "Stone Quarries," in the latter end of 1886; and a long leading article on "Granite Quarrying" which afterwards appeared (all of which have subsequently been issued in book-form), had previously attracted that gentleman's attention in Stockholm, and were made the basis of his work whilst in this country. The results of his labours have only just been officially published,* and the information obtained from the articles alluded to is duly acknowledged. In this book, amongst other things, the author shows that Swedish quarry-owners and proprietors of polishing works have much to learn of the British, especially in regard to polishing; and he is of opinion that, whilst we polish granite more cheaply and much quicker than the Swedes, the latter, through taking more time over it, do the work better. The publication of this book, coming from such an authoritative quarter, cannot fail to influence the industry in Sweden, in showing granite merchants how improvements may be effected in various ways; and we know of a case in which one of their largest granite-owners has already taken advantage of the superior methods adopted in this country.

As Swedish granite-merchants have much to learn from us, so have we a great deal to learn from them, not the least important desideratum being as to why they are enabled to put granite into our markets so cheaply. But if we wait until our Government sends out some competent person to Sweden to go exhaustively into the matter, we shall wait in vain; though it would be no more difficult to institute such an inquiry in Sweden than it was for the Swedes to come here,—in fact it would be much easier. There are certain preliminary points in connexion with Swedish granites and the industry generally, however, that we might now profitably discuss in the absence of a more complete inquiry.

Extensive tracts of Sweden are formed of Laurentian rocks, which embrace many kinds of red and grey gneiss. The former colour predominates in the western parts of the kingdom, in the north of Scania, in Halland, Westergötland, and a part of Wermland; the latter in the eastern, in Blekinge, Södermanland, Upland, Helsingland, and Medelpad. The granites also are numerous and of varying structure and composition. The chief masses belong to a time anterior to the Cambrian period. They generally occur as great masses, which follow the major axis of the country from north to south. As a rule granite is found in the interior, whilst gneiss predominates along the coast; to this, however, there are marked exceptions, the principal being furnished by the tracts whereon the greater number of the granite quarries

* "Om Granitindustrien i utlandet, särskildt Storbritannien." (Sveriges Geologiska undersökning.) Af Hjalmar Lundbohm. Stockholm. 1889. (Swedish text only.)

are situated. The two crystalline rocks mentioned have, as usual, but one name in the market,—viz., granite. They are quarried chiefly along the coasts and fjords, and in islands in—1. Bohuslän; 2. Halland; 3. Blekinge; 4. Småland; 5. Östergötland; and 6. Stockholm, which districts include also the principal business centres of the country.

1. *Bohuslän.*—The granite in this district varies from fine to medium-grain, the prevailing colours being light-grey and pink. The chief quarrying districts are situated west of Iddefjorden, near Hunnebostrand, and Lysekil. The quarries at the first-mentioned place are in the hands of Norwegian merchants, being near the frontier. Malmön, an island near Lysekil, is the place where granite was first worked to any extent in Sweden,—in the year 1844. There, also, is the only polishing establishment in Bohuslän, the oldest works of the kind in the country. The granite from Malmön is principally of three kinds. The first is of a brownish-yellow colour, speckled black, is very fine-grained, being largely used for paving, building, harbours, docks, and, to some extent, also for monumental purposes. The second is of a light salmon-colour, slightly coarser in grain, and is in much request by architects for outside walling. It is only within the last few years that granite has been used for this purpose in Sweden. The third variety is of very fine grain, light grey in colour, and suitable (so far as such a heavy rock as granite can be suitable) for carvings. It occurs as a vein running through part of the island. In the vicinity of Malmön, there is a quarry for paving-stone in a similar rock.

A coarse-grained granite, of dark greyish yellow tint, which contains much smoky quartz and takes a fine polish, comes from Gåsö, near Lysekil. The small island of Buholmen, also near Lysekil, furnishes decidedly the most handsome granite in this part of the country. It is coarse-grained (Swedish merchants call it "medium"), having ragged patches of pink and green felspar with smoky quartz, polishes beautifully, and is largely exported in monumental form to Germany, Denmark, and Aberdeen. Part of the stone in the island is fine-grained, and is very extensively raised for paving and building. Its very even grain and colour, and the easy and cheap method by which it is quarried and worked, render this stone a formidable competitor in the market. The joints in the quarries are regular, running nearly horizontal and vertical. In this there is considerable analogy with our Cornish granites, the weathering along the joints at the surface in both cases having influenced the shape of the hills; the result is that the material is worked on a rising bed. The inclination of the "bedding" joints, however, is not quite so great as in the majority of Cornish quarries, whilst the beds themselves are not so thick as in the latter. There is very little or no overburden. The structure of the stone is, nevertheless, entirely dissimilar to any found in Cornwall. A coarse red granitic gneiss, not unlike the so-called antique Egyptian syenite (really a hornblendic granite), occurs a little south of Lysekil. Some small quarries for paving-stone have been opened near Gothenburg, the best known of which, perhaps, is called Fiskebäck. The majority of the quarries in Bohuslän are close to the sea; there are also excellent harbours and good accommodation for shipping the material.

2. *Halland.*—The predominating rock in this district, and indeed in south-western Sweden, is called an "iron-gneiss." It is principally worked near Halmstad and at Falkenberg. The stone varies much in regard to colour, structure, and relative quantity of constituent minerals. The two most common kinds are (1) from Gutbranstorp, near Halmstad, having flesh-coloured felspar, white quartz, and black biotite mica; and (2) from Falkenberg, a dark-grey rock with lines of pink and white felspar. They nearly always contain small crystals of magnetic iron. The stone is very hard, but easy to split, and makes good paving-setts, although the jointing is not regular. These quarries also are generally situated near the sea, but the harbours are not so good as in Bohuslän. The greater part of the material is sent to Copenhagen and various North German cities. The dark-green gneiss (pyroxene-gneiss) from Varberg is, perhaps, one of the best-known rocks of Sweden. It is of a very rich colour, though rather too dark, takes a good polish, and is believed to be one of the most beautiful monumental stones sent out of the country. Large quantities are exported to Germany, Denmark, and Great Britain. This rock may frequently be seen in certain monumental-granite merchants' yards in Aberdeen, and, on the occasion of a visit to that city, we were informed that it had a ready sale. It is evidently more suitable for interior ornament than exterior work.

3. *Blekinge.* — The largest quarries in Sweden for paving and engineering blocks are found in the small island of Jjurkö, near Carlskrona, where the stone is a gneissose-granite, having red felspar, grey and black quartz, and very little mica. It is very hard, but easy to work. Other large workings are at Sternö, near Carlshamn, and Kläfnen, a small island near Ronneby. The granite at the former place is coarse-grained, and very closely resembles that from Tillyfourie, near Aberdeen, the principal difference being that the felspar in the Sternö rock occurs as larger crystals. The granite from Kläfnen is finer-grained, being light-pink in colour; it is largely used for paving, for which purpose it certainly appears to be very suitable. At Almö, near Carlskrona, and at Sandvik, near Carlshamn, even, fine-grained granites are raised, the tint being red at the former place and grey at the latter. The stone is principally exported to Germany, being especially used for paving in Berlin.

4. *Småland.*—In the great mass of granite forming the eastern half of the district of Gothland many varieties of the rock occur, mostly suitable for building and ornamental purposes. In this part of the country the joints are generally very regular, which much facilitate their working, causing but very little waste. The red granite from Vänevik, near Påskallavik, largely exported to Germany, is coarse-grained, the quartz is light yellow and amethystine, the large orthoclase felspars occur as deep-red crystals, whilst the mica is present only in very small quantities. The handsome appearance of the stone is chiefly due to the delicate tints of the quartz. Virbo, north of Oscarshamn, produces a coarse-grained, deep-red granite of historic interest. It is mostly worked for pedestals and other monumental purposes. We may mention that the much-talked-of "Siegesdenkmal," or memorial monument of the Franco-German War of 1871, in the "Thiergarten" of Berlin, is principally built of this stone. The small island of Jungfrun, in Kalmarsund, is made of rock of very similar appearance to that from Virbo, with which, at first sight, it might very easily be confounded.

Polishing-machines have been erected near Vestervik to work the fine-grained pink granite from Flivik, and the almost black granitic rock and gneiss of the neighbourhood.

5. *Östergötland.*—The well-known granites and polishing works of Grafversfors are situated in this district. The four principal varieties of the stone are all coarse-grained, two being red speckled grey and black, the third is pink, and the last bluish-black. Not one of them is a true granite. The red kinds are exceedingly handsome stones, the coarser-grained having the constituent minerals much crushed, the divisions being surrounded by red peroxide of iron, whilst the other rock has light blue, almost opalescent quartz. A celebrated vase in Lund, 15 ft. in diameter, is made of the last-mentioned material. The fine-grained pink and grey granites from Jonsberg, east of Norrköping, are extensively raised for paving and building, whilst the dark grey stone from near the last-mentioned town, and the coarse, brownish-yellow granite from Bankeberg, near Linköping, are chiefly used for monumental and architectural purposes. Grafversfors is the principal granite centre in this district.

6. *Stockholm.*—All the granite occurring in the immediate neighbourhood of the capital is of a light grey colour, very fine in texture, compact and hard. The quarries are very numerous, the chief being at Hufvudsta, the stone being principally used for paving and building in Stockholm. Several new quarries have recently been opened between that city and Upsala. At the latter place the stone is dark grey, and contains a fair proportion of hornblende. This fine rock, distinguished by its bluish-grey quartz, is in very great demand, being the only kind of stone serviceable for building purposes that is at the command of the town. The new foundation of Upsala Cathedral consists of this material.

The northern and central portions of Sweden, although possessing a great quantity of granite, do not furnish much to the market. A fine-grained, slightly porphyritic, red granite, found and polished near Elfdal, in Dalarne, is a pretty stone, and in its time has provided the material for many Royal presents. The large polished sarcophagus of King Charles XIV., a celebrated vase at the Royal Castle of Rosendal, near Stockholm, and one of the finest urns possessed by her Majesty the Queen, are all made of it.

A brick-red granite comes from Rödän, near Sundsvall, and is remarkable in that nearly the whole rock is made of orthoclase felspar, the other minerals being quite secondary in importance.

The specific gravity of the different varieties of Swedish granite mentioned is from 2·56 to 2·67. A cubic foot weighs from 157 to 164 Swedish pounds (147·1—153·72 lbs. English), and, when put into water about ninety hours, absorbs from 3 to 7 Ort (12·73—29·75 grammes) of that liquid.

During the last few years Swedish black diorites and hyperites, both highly crystalline rocks, have been in great demand, large quantities being sent away to Germany and Denmark. Black diorite is quarried, amongst other places, at Vestervik, in Småland.

The old porphyry works at Elfdal, which are well known in England and all over Europe, are now closed, but the splendid blocks of porphyry found in the district are still worked at a more convenient place by J. A. Melkersons, of Mora. There are a great number of different-coloured varieties; the old works had about thirty kinds. It is mostly used for rich interior ornament, vases, urns, &c.; also for tombstones and monuments. Large blocks, however, cannot be obtained.

Amongst the principal firms of granite-merchants in Sweden we may mention C. A. Kullgrens Enka, of Uddevalla, the Halmstads Stenhuggeriaktiebolag, F. H. Wolff, of Carlskrona, Kessel & Röhl, of Vänevik, Nilsson & Co., of Vestervik, the Almö Stenhuggeri, and the Grafversfors Stensliperi. By-the-bye, the Swedes have a standing joke against English engineers and contractors. The first-mentioned firm, perhaps the largest of all, is almost invariably addressed by them as "Herr C. A. Kullgrens Enka." Letters are commenced "Dear Sir." It may be well to remember that "enka" means widow, and that although the name of the proprietress is Kullgren, the style of the firm, following Swedish custom, is "Kullgrens Enka."

It will be observed that we have not often, in the foregoing remarks, drawn attention to any similarity between Swedish and British granites in regard to composition and structure. The fact is that they are, with but few exceptions, totally unlike each other. Some certainly approach (in structure only) the fine grey Aberdeen stones, but there is not even the faintest indication of anything like a Cornish granite in any Swedish stone we know of. Some of the red granites, although somewhat like that from Mountsorrel, in Leicestershire, are easily distinguishable. Indeed, it may be said generally, that a man who really knows his business ought to detect any of the commoner kinds of Swedish granite in the

market at the first glance. This is satisfactory so far as it goes.

There are many reasons why Swedish granite can be put into the British market so cheaply. In the first place, nearly all the quarries are quite close to the sea, in some cases actually on the sea-shore (or near some leading water-way inland), whilst the natural harbours and shipping accommodation are very good. The majority of British granite-quarries, as we have on a former occasion pointed out, are a little distance inland, and carriage to the nearest port of shipment adds considerably to the cost of the material. Again, the joints in the Swedish quarries are often so regularly disposed, and are at such convenient intervals from each other, that at many of the workings in Bohuslän, for example, the men cut the paving-setts from the rock *in situ* by simply making a series of parallel cuts through the stone, and the material is so free that this is done with the greatest facility. By this means very little labour is expended in masoning, and there is not much waste to cart away. In England, in those places where the beds are tolerably regular, as a rule the beds run too thick to enable paving-setts or kerbing to be cut in this way. The paving masons in Sweden often quarry on their own account, and sell the paving-setts to the quarry proprietor, which system obtains in this country also to some extent, especially in Cornwall. We are informed that Swedish masons, in this way, can often make 5*s.* per day. Piece-work, however, is the common practice for other branches of the trade, except in regard to such labour as cannot be conveniently dealt with in that way. Many men get 3*s.* 6*d.* for their day's work, but some take less, depending on the district. Wages generally are lower than in British granite-quarries and works. This can be accounted for in many ways,—not the least significant being the circumstance that the cost of living in Sweden is comparatively little. No coal is found in that country; what coal is used is mostly English; but some of the granite-polishers (as at Grafversfors) use water-power, which is cheaper. The "feathers" of the "plug and feather" wedges for cutting granite are shaped differently in Sweden. The "feathers" there are square, whilst those used in this country have rounded backs to suit the sides of the holes; there is no doubt that ours is the better shape. Gunpowder is the ordinary explosive in quarrying, and as foremen in Sweden seem to understand its capabilities better than the majority of our men do, they are much more economic in its use. Dynamite is seldom, if ever, employed. The rent (including royalties, &c.) of quarries is higher here than in that country.

When all these things are taken into careful consideration there is little wonder that Swedish granite competes so successfully in the market.

Before concluding, we may as well point out that the work of the Swedish Geological Survey is eminently practical in its character. It not only maps and describes geological phenomena from a purely philosophical point of view, but issues separate publications, written by men who thoroughly understand the subject, on certain tracts of country of economic interest, indicating, amongst other things, the presence of good and bad stone. As an example of this kind of work, we may cite the practical geological treatise on the district of Kalmar,* in south-eastern Sweden. It minutely describes the granites in the area, pointing out where stone of good quality exists that could be easily worked and shipped, &c. It is accompanied by a large map, on which not only is the area occupied by granite clearly shown (together with that of other stones and minerals), but the particular kinds of granite are separately mapped. Thus it shows the areas respectively occupied by foliated, red, grey, coarse-grained, medium-grained, fine-grained, and porphyroid granite. The possession of such a work is invaluable to a granite-merchant in seeking sites for new quarries; and it is often instrumental in indicating the presence of suitable stone near towns requiring the material, saving cartage, &c. Maps on this plan, dealing with the building-stone areas of our own country, would be very useful to British quarry-owners, and they could be executed for very little money. The stone industry, from its magnitude and the thousands of men employed in it, is one of the most important in the country; but, like as in regard to other industries, we fear that the time is still in the dim and distant future when the British Government will take enough interest in it as to place sufficient funds in the hands of our Geological Surveys to enable them to publish a series of this kind of practical geological maps. We are far behind some Continental countries in this, as in many other scientific things of a kindred nature.

* "Praktiskt geologiska undersökningar inom norra delen af Kalmar län," &c. Stockholm. 1884.

NOTES.

THE conditions of competition for the new Municipal Buildings at Sheffield deserve notice, amid the frequently ill-regulated competition schemes of the day, for the sensible and fair spirit in which they are framed. The first competition is to be a sketch one, open to all comers, and appears to fulfil the proper conditions of a sketch competition: the scale of the drawings is to be $\frac{1}{16}$ in. to a foot; the drawings are limited to plans, two sections, and an elevation, on strainers 2′ 0″ × 1′ 6″ in size; alternative designs (often sent in by young competitors, with a notion of having "a double chance") are to be ruled out. A schedule of accommodation is added, with the sizes of the rooms required, but it is to be noted that these are "suggestive sizes" only, and not absolutely binding; a relaxation which removes a great stumbling-block often felt in competition plans, when a demand for precise adherence to specified sizes breaks a plan down at some one point, just when the principal difficulties are got over. The Corporation of Sheffield will select six sets from these, under the advice of their assessor, and 600*l.* will be distributed equally among these selected men for providing such further drawings as may be considered necessary for a final selection. The assessor will be Mr. Waterhouse, in both competitions; but the Corporation reserve to themselves the right of ultimately deciding which design they will accept. From the terms and spirit of their conditions, however, we may fairly conclude that they intend to give all proper weight to the opinion of the assessor. This ought to be a model competition, and we hope the result will be a fine building for Sheffield.

HAWKSMOOR'S well-known Church of St. Mary, Woolnoth, at the corner of Lombard-street and King William-street, has been closed till further notice, pending an investigation into its sanitary condition. From a paragraph which appeared in the *City Press*, it might be inferred that the evil smells which are complained of are attributable to interments in the vaults below; but personal inspection and inquiry do not enable us to take this view of the case. In company with Mr. H. D. Phillips, the Vestry Clerk, we have this week visited the church. On descending into the vaults we were unable to detect any unpleasant odour; and from the fact that, under the direction of Mr. Penrose, all the coffins and graves in the vaults were some years ago covered with layers of charcoal and cement concrete, to an aggregate depth of 5 ft. or 6ft., the top of the concrete being hermetically closed by a rendering of fine cement, we did not anticipate any other result of our investigation on this head. Mr. Phillips himself made no secret of his opinion that the scare which has led to the temporary closing of the church is unduly alarmist in character, but at the same time he admitted that he had at times perceived a bad odour apparently proceeding from behind the wall-panelling. (This might be due to the decaying remains of a dead mouse or rat.) One of the pew-openers, too, told us that when the church was first opened in the morning the bad smells were very apparent, and that she has herself suffered much from sore throat. The church is, no doubt, in an insanitary condition; but, so far as we were able to form a judgment, its insanitary condition is due,—firstly, to want of adequate ventilation; secondly, to a defective water-closet, very badly placed; and, perhaps, thirdly, to sewer-air emitted from a sewer-gully or grid in King William-street, close to the side door of the church. As to the first point, the air of the church seems to be perpetually stagnant, and no wonder, for apparently the only provision ever made for ventilation is by four "hoppers," one in the centre of each of the four large lunettes which form the clearstory windows. Of these four hoppers, one cannot be opened at all, owing to failure of the gear, and another is not opened because it is broken and in a dangerous condition; only two of these small openings, therefore, are available for the ventilation of the church. The only other windows in the church are the four at a lower level on the south side, next King William-street, and these do not open at all, although the heads could easily be made to do so. As to the second point, the water-closet is an old one of the dangerous and unhealthy kind known as the "pan closet"; its water supply is so defective that at times it is without any at all; and it is placed in a most cramped and confined situation, in a narrow low recess leading out of a narrow passage leading from the vestry. There is no ventilation from the closet except by an opening above the top of the door into this passage, the other end of which leads to the open air. The current of air, we should say, is generally inwards along this narrow passage towards the vestry, and thence, no doubt, through the vestry into the church. We have said enough, we think, to show that there is quite sufficient in these facts to account for the bad air in the church, without attributing it to the interments, or even to the whiff of sewer-air which assailed our nostrils as we passed along the pavement of King William-street. We are glad to hear that the sanitary arrangements of the church are to be thoroughly overhauled.

AMONG the exhibits at the Berlin Accident Prevention Exhibition,—which has proved a great success,—a model theatre attracts much notice, furnished with all safety appliances. For the prevention and arrest of fire, all the materials used in its construction are impregnated with a chemical solution, said to be fireproof; whilst the ordinary drop-curtain,—there being also an iron one behind,—is made of cow-hair, a material which, it is said, is excellent for the arrest of flames. There are a great number of exits for a rapid emptying of the building, worked on various systems, the opening of some being effected direct from the machine-room behind the stage by means of electricity, whilst others show different lock-and-key systems. In the roof are huge shutters, which may be opened from below to admit of the escape of smoke. Another novelty is a lever upon the back of every seat in the theatre, which, by a single twist of the hand, turns the chair up horizontally aside against the next one, whereby lengthways passages are formed when desired. There is no other illumination in the house but the electric light, worked by a dynamo; but, in case this supply has to be turned off, there is a large number of glow-lamps fed directly from accumulators. This last feature is an excellent one. For the rest, it is probable that such complications of contrivance as are here described will only prove a source of confusion in the event of danger, and that such model theatres are of more interest as popular exhibits than they will ever be in practice.

THE thanks of architects and archæologists are due to the *Standard* for helping to spread a protest against the careless treatment of monumental brasses. The "restorer" is not always the Vandal he is painted; but

are situated. The two crystalline rocks mentioned have, as usual, but one name in the market,—viz., granite. They are quarried chiefly along the coasts and fjords, and in islands in—1. Bohuslän; 2. Halland; 3. Blekinge; 4. Småland; 5. Östergötland; and 6. Stockholm, which districts include also the principal business centres of the country.

1. *Bohuslän.*—The granite in this district varies from fine to medium-grain, the prevailing colours being light-grey and pink. The chief quarrying districts are situated west of Iddefjorden, near Hunnebostrand, and Lysekil. The quarries at the first-mentioned place are in the hands of Norwegian merchants, being near the frontier. Malmön, an island near Lysekil, is the place where granite was first worked to any extent in Sweden,—in the year 1844. There, also, is the only polishing establishment in Bohuslän, the oldest works of the kind in the country. The granite from Malmön is principally of three kinds. The first is of a brownish-yellow colour, speckled black, is very fine-grained, being largely used for paving, building, harbours, docks, and, to some extent, also for monumental purposes. The second is of a light salmon-colour, slightly coarser in grain, and is in much request by architects for outside walling. It is only within the last few years that granite has been used for this purpose in Sweden. The third variety is of very fine grain, light grey in colour, and suitable (so far as such a heavy rock as granite can be suitable) for carvings. It occurs as a vein running through part of the island. In the vicinity of Malmön, there is a quarry for paving-stone in a similar rock.

A coarse-grained granite, of dark greyish yellow tint, which contains much smoky quartz and takes a fine polish, comes from Gåsö, near Lysekil. The small island of Buholmen, also near Lysekil, furnishes decidedly the most handsome granite in this part of the country. It is coarse-grained (Swedish merchants call it "medium"), having ragged patches of pink and green felspar with smoky quartz, polishes beautifully, and is largely exported in monumental form to Germany, Denmark, and Aberdeen. Part of the stone in the island is fine-grained, and is very extensively raised for paving and building. Its very even grain and colour, and the easy and cheap method by which it is quarried and worked, render this stone a formidable competitor in the market. The joints in the quarries are regular, running nearly horizontal and vertical. In this there is considerable analogy with our Cornish granites, the weathering along the joints at the surface in both cases having influenced the shape of the hills; the result is that the material is worked on a rising bed. The inclination of the "bedding" joints, however, is not quite so great as in the majority of Cornish quarries, whilst the beds themselves are not so thick as in the latter. There is very little or no overburden. The structure of the stone is, nevertheless, entirely dissimilar to any found in Cornwall. A coarse red granitic gneiss, not unlike the so-called antique Egyptian syenite (really a hornblendic granite), occurs a little south of Lysekil. Some small quarries for paving-stone have been opened near Gothenburg, the best known of which, perhaps, is called Fiskebäck. The majority of the quarries in Bohuslän are close to the sea; there are also excellent harbours and good accommodation for shipping the material.

2. *Halland.*—The predominating rock in this district, and indeed in south-western Sweden, is called an "iron-gneiss." It is principally worked near Halmstad and at Falkenberg. The stone varies much in regard to colour, structure, and relative quantity of constituent minerals. The two most common kinds are (1) from Gutbranstorp, near Halmstad, having flesh-coloured felspar, white quartz, and black biotite mica; and (2) from Falkenberg, a dark-grey rock with lines of pink and white felspar. They nearly always contain small crystals of magnetic iron. The stone is very hard, but easy to split, and makes good paving-setts, although the jointing is not regular. These quarries also are generally situated near the sea, but the harbours are not so good as in Bohuslän. The greater part of the material is sent to Copenhagen and various North German cities. The dark-green gneiss (pyroxene-gneiss) from Varberg is, perhaps, one of the best-known rocks of Sweden. It is of a very rich colour, though rather too dark, takes a good polish, and is believed to be one of the most beautiful monumental stones sent out of the country. Large quantities are exported to Germany, Denmark, and Great Britain. This rock may frequently be seen in certain monumental-granite merchants' yards in Aberdeen, and, on the occasion of a visit to that city, we were informed that it had a ready sale. It is evidently more suitable for interior ornament than exterior work.

3. *Blekinge.* — The largest quarries in Sweden for paving and engineering blocks are found in the small island of Jjurkö, near Carlskrona, where the stone is a gneissose-granite, having red felspar, grey and black quartz, and very little mica. It is very hard, but easy to work. Other large workings are at Sternö, near Carlshamn, and Klåfnen, a small island near Ronneby. The granite at the former place is coarse-grained, and very closely resembles that from Tillyfourie, near Aberdeen, the principal difference being that the felspar in the Sternö rock occurs as larger crystals. The granite from Klåfnen is finer-grained, being light-pink in colour; it is largely used for paving, for which purpose it certainly appears to be very suitable. At Almö, near Carlskrona, and at Sandvik, near Carlshamn, even, fine-grained granites are raised, the tint being red at the former place and grey at the latter. The stone is principally exported to Germany, being especially used for paving in Berlin.

4. *Småland.*—In the great mass of granite forming the eastern half of the district of Gothland many varieties of the rock occur, mostly suitable for building and ornamental purposes. In this part of the country the joints are generally very regular, which much facilitate their working, causing but very little waste. The red granite from Vånevik, near Påskallavik, largely exported to Germany, is coarse-grained, the quartz is light yellow and amethystine, the large orthoclase felspars occur as deep-red crystals, whilst the mica is present only in very small quantities. The handsome appearance of the stone is chiefly due to the delicate tints of the quartz. Virbo, north of Oscarshamn, produces a coarse-grained, deep-red granite of historic interest. It is mostly worked for pedestals and other monumental purposes. We may mention that the much-talked-of "Siegesdenkmal," or memorial monument of the Franco-German War of 1871, in the "Thiergarten" of Berlin, is principally built of this stone. The small island of Jungfrun, in Kalmarsund, is made of rock of very similar appearance to that from Virbo, with which, at first sight, it might very easily be confounded.

Polishing-machines have been erected near Vestervik to work the fine-grained pink granite from Flivik, and the almost black granitic rock and gneiss of the neighbourhood.

5. *Östergötland.*—The well-known granites and polishing works of Grafversfors are situated in this district. The four principal varieties of the stone are all coarse-grained, two being red speckled grey and black, the third is pink, and the last bluish-black. Not one of them is a true granite. The red kinds are exceedingly handsome stones, the coarser-grained having the constituent minerals much crushed, the divisions being surrounded by red peroxide of iron, whilst the other rock has light blue, almost opalescent quartz. A celebrated vase in Lund, 15 ft. in diameter, is made of the last-mentioned material. The fine-grained pink and grey granites from Jonsberg, east of Norrköping, are extensively raised for paving and building, whilst the dark grey stone from near the last-mentioned town, and the coarse, brownish-yellow granite from Bankeberg, near Linköping, are chiefly used for monumental and architectural purposes. Grafversfors is the principal granite centre in this district.

6. *Stockholm.*—All the granite occurring in the immediate neighbourhood of the capital is of a light grey colour, very fine in texture, compact and hard. The quarries are very numerous, the chief being at Hufvudsta, the stone being principally used for paving and building in Stockholm. Several new quarries have recently been opened between that city and Upsala. At the latter place the stone is dark grey, and contains a fair proportion of hornblende. This fine rock, distinguished by its bluish-grey quartz, is in very great demand, being the only kind of stone serviceable for building purposes that is at the command of the town. The new foundation of Upsala Cathedral consists of this material.

The northern and central portions of Sweden, although possessing a great quantity of granite, do not furnish much to the market. A fine-grained, slightly porphyritic, red granite, found and polished near Elfdal, in Dalarne, is a pretty stone, and in its time has provided the material for many Royal presents. The large polished sarcophagus of King Charles XIV., a celebrated vase at the Royal Castle of Rosendal, near Stockholm, and one of the finest urns possessed by her Majesty the Queen, are all made of it.

A brick-red granite comes from Rödän, near Sundsvall, and is remarkable in that nearly the whole rock is made of orthoclase felspar, the other minerals being quite secondary in importance.

The specific gravity of the different varieties of Swedish granite mentioned is from 2·56 to 2·67. A cubic foot weighs from 157 to 164 Swedish pounds (147·1—153·72 lbs. English), and, when put into water about ninety hours, absorbs from 3 to 7 Ort (12·73—29·75 grammes) of that liquid.

During the last few years Swedish black diorites and hyperites, both highly crystalline rocks, have been in great demand, large quantities being sent away to Germany and Denmark. Black diorite is quarried, amongst other places, at Vestervik, in Småland.

The old porphyry works at Elfdal, which are well known in England and all over Europe, are now closed, but the splendid blocks of porphyry found in the district are still worked at a more convenient place by J. A. Melkersons, of Mora. There are a great number of different-coloured varieties; the old works had about thirty kinds. It is mostly used for rich interior ornament, vases, urns, &c.; also for tombstones and monuments. Large blocks, however, cannot be obtained.

Amongst the principal firms of granite-merchants in Sweden we may mention C. A. Kullgrens Enka, of Uddevalla, the Halmstads Stenhuggeriaktiebolag, F. H. Wolff, of Carlskrona, Kessel & Röhl, of Vånevik, Nilsson & Co., of Vestervik, the Almö Stenhuggeri, and the Grafversfors Stensliperi. By-the-bye, the Swedes have a standing joke against English engineers and contractors. The first-mentioned firm, perhaps the largest of all, is almost invariably addressed by them as "Herr C. A. Kullgrens Enka." Letters are commenced "Dear Sir." It may be well to remember that "enka" means widow, and that although the name of the proprietress is Kullgren, the style of the firm, following Swedish custom, is "Kullgrens Enka."

It will be observed that we have not often, in the foregoing remarks, drawn attention to any similarity between Swedish and British granites in regard to composition and structure. The fact is that they are, with but few exceptions, totally unlike each other. Some certainly approach (in structure only) the fine grey Aberdeen stones, but there is not even the faintest indication of anything like a Cornish granite in any Swedish stone we know of. Some of the red granites, although somewhat like that from Mountsorrel, in Leicestershire, are easily distinguishable. Indeed, it may be said generally, that a man who really knows his business ought to detect any of the commoner kinds of Swedish granite in the

market at the first glance. This is satisfactory so far as it goes.

There are many reasons why Swedish granite can be put into the British market so cheaply. In the first place, nearly all the quarries are quite close to the sea, in some cases actually on the sea-shore (or near some leading water-way inland), whilst the natural harbours and shipping accommodation are very good. The majority of British granite-quarries, as we have on a former occasion pointed out, are a little distance inland, and carriage to the nearest port of shipment adds considerably to the cost of the material. Again, the joints in the Swedish quarries are often so regularly disposed, and are at such convenient intervals from each other, that at many of the workings in Bohuslän, for example, the men cut the paving-setts from the rock *in situ* by simply making a series of parallel cuts through the stone, and the material is so free that this is done with the greatest facility. By this means very little labour is expended in masoning, and there is not much waste to cart away. In England, in those places where the beds are tolerably regular, as a rule the beds run too thick to enable paving-setts or kerbing to be cut in this way. The paving masons in Sweden often quarry on their own account, and sell the paving-setts to the quarry proprietor, which system obtains in this country also to some extent, especially in Cornwall. We are informed that Swedish masons, in this way, can often make 5s. per day. Piece-work, however, is the common practice for other branches of the trade, except in regard to such labour as cannot be conveniently dealt with in that way. Many men get 3s. 6d. for their day's work, but some take less, depending on the district. Wages generally are lower than in British granite-quarries and works. This can be accounted for in many ways,—not the least significant being the circumstance that the cost of living in Sweden is comparatively little. No coal is found in that country; what coal is used is mostly English; but some of the granite-polishers (as at Grafversfors) use water-power, which is cheaper. The "feathers" of the "plug and feather" wedges for cutting granite are shaped differently in Sweden. The "feathers" there are square, whilst those used in this country have rounded backs to suit the sides of the holes; there is no doubt that ours is the better shape. Gunpowder is the ordinary explosive in quarrying, and as foremen in Sweden seem to understand its capabilities better than the majority of our men do, they are much more economic in its use. Dynamite is seldom, if ever, employed. The rent (including royalties, &c.) of quarries is higher here than in that country.

When all these things are taken into careful consideration there is little wonder that Swedish granite competes so successfully in the market.

Before concluding, we may as well point out that the work of the Swedish Geological Survey is eminently practical in its character. It not only maps and describes geological phenomena from a purely philosophical point of view, but issues separate publications, written by men who thoroughly understand the subject, on certain tracts of country of economic interest, indicating, amongst other things, the presence of good and bad stone. As an example of this kind of work, we may cite the practical geological treatise on the district of Kalmar,* in south-eastern Sweden. It minutely describes the granites in the area, pointing out where stone of good quality exists that could be easily worked and shipped, &c. It is accompanied by a large map, on which not only is the area occupied by granite clearly shown (together with that of other stones and minerals), but the particular kinds of granite are separately mapped. Thus it shows the areas respectively occupied by foliated, red, grey, coarse-grained, medium-grained, fine-grained, and porphyroid granite. The possession of such a work is invaluable to a granite-merchant in seeking sites for new quarries; and it is often instrumental in indicating the presence of suitable stone near towns requiring the material, saving cartage, &c. Maps on this plan, dealing with the building-stone areas of our own country, would be very useful to British quarry-owners, and they could be executed for very little money. The stone industry, from its magnitude and the thousands of men employed in it, is one of the most important in the country; but, like as in regard to other industries, we fear that the time is still in the dim and distant future when the British Government will take enough interest in it as to place sufficient funds in the hands of our Geological Surveys to enable them to publish a series of this kind of practical geological maps. We are far behind some Continental countries in this, as in many other scientific things of a kindred nature.

* "Praktiskt geologiska undersökningar inom norra delen af Kalmar län," &c. Stockholm. 1884.

NOTES.

THE conditions of competition for the new Municipal Buildings at Sheffield deserve notice, amid the frequently ill-regulated competition schemes of the day, for the sensible and fair spirit in which they are framed. The first competition is to be a sketch one, open to all comers, and appears to fulfil the proper conditions of a sketch competition: the scale of the drawings is to be $\frac{1}{16}$ in. to a foot; the drawings are limited to plans, two sections, and an elevation, on strainers 2′ 0″ × 1′ 6″ in size; alternative designs (often sent in by young competitors, with a notion of having "a double chance") are to be ruled out. A schedule of accommodation is added, with the sizes of the rooms required, but it is to be noted that these are "suggestive sizes" only, and not absolutely binding; a relaxation which removes a great stumbling-block often felt in competition plans, when a demand for precise adherence to specified sizes breaks a plan down at some one point, just when the principal difficulties are got over. The Corporation of Sheffield will select six sets from these, under the advice of their assessor, and 600*l.* will be distributed equally among these selected men for providing such further drawings as may be considered necessary for a final selection. The assessor will be Mr. Waterhouse, in both competitions; but the Corporation reserve to themselves the right of ultimately deciding which design they will accept. From the terms and spirit of their conditions, however, we may fairly conclude that they intend to give all proper weight to the opinion of the assessor. This ought to be a model competition, and we hope the result will be a fine building for Sheffield.

HAWKSMOOR'S well-known Church of St. Mary, Woolnoth, at the corner of Lombard-street and King William-street, has been closed till further notice, pending an investigation into its sanitary condition. From a paragraph which appeared in the *City Press*, it might be inferred that the evil smells which are complained of are attributable to interments in the vaults below; but personal inspection and inquiry do not enable us to take this view of the case. In company with Mr. H. D. Phillips, the Vestry Clerk, we have this week visited the church. On descending into the vaults we were unable to detect any unpleasant odour; and from the fact that, under the direction of Mr. Penrose, all the coffins and graves in the vaults were some years ago covered with layers of charcoal and cement concrete, to an aggregate depth of 5 ft. or 6ft., the top of the concrete being hermetically closed by a rendering of fine cement, we did not anticipate any other result of our investigation on this head. Mr. Phillips himself made no secret of his opinion that the scare which has led to the temporary closing of the church is unduly alarmist in character, but at the same time he admitted that he had at times perceived a bad odour apparently proceeding from behind the wall-panelling. (This might be due to the decaying remains of a dead mouse or rat.) One of the pew-openers, too, told us that when the church was first opened in the morning the bad smells were very apparent, and that she has herself suffered much from sore throat. The church is, no doubt, in an insanitary condition; but, so far as we were able to form a judgment, its insanitary condition is due,—firstly, to want of adequate ventilation; secondly, to a defective water-closet, very badly placed; and, perhaps, thirdly, to sewer-air emitted from a sewer-gully or grid in King William-street, close to the side door of the church. As to the first point, the air of the church seems to be perpetually stagnant, and no wonder, for apparently the only provision ever made for ventilation is by four "hoppers," one in the centre of each of the four large lunettes which form the clearstory windows. Of these four hoppers, one cannot be opened at all, owing to failure of the gear, and another is not opened because it is broken and in a dangerous condition; only two of these small openings, therefore, are available for the ventilation of the church. The only other windows in the church are the four at a lower level on the south side, next King William-street, and these do not open at all, although the heads could easily be made to do so. As to the second point, the water-closet is an old one of the dangerous and unhealthy kind known as the "pan closet"; its water supply is so defective that at times it is without any at all; and it is placed in a most cramped and confined situation, in a narrow low recess leading out of a narrow passage leading from the vestry. There is no ventilation from the closet except by an opening above the top of the door into this passage, the other end of which leads to the open air. The current of air, we should say, is generally inwards along this narrow passage towards the vestry, and thence, no doubt, through the vestry into the church. We have said enough, we think, to show that there is quite sufficient in these facts to account for the bad air in the church, without attributing it to the interments, or even to the whiff of sewer-air which assailed our nostrils as we passed along the pavement of King William-street. We are glad to hear that the sanitary arrangements of the church are to be thoroughly overhauled.

AMONG the exhibits at the Berlin Accident Prevention Exhibition,—which has proved a great success,—a model theatre attracts much notice, furnished with all safety appliances. For the prevention and arrest of fire, all the materials used in its construction are impregnated with a chemical solution, said to be fireproof; whilst the ordinary drop-curtain,—there being also an iron one behind,—is made of cow-hair, a material which, it is said, is excellent for the arrest of flames. There are a great number of exits for a rapid emptying of the building, worked on various systems, the opening of some being effected direct from the machine-room behind the stage by means of electricity, whilst others show different lock-and-key systems. In the roof are huge shutters, which may be opened from below to admit of the escape of smoke. Another novelty is a lever upon the back of every seat in the theatre, which, by a single twist of the hand, turns the chair up horizontally aside against the next one, whereby lengthways passages are formed when desired. There is no other illumination in the house but the electric light, worked by a dynamo; but, in case this supply has to be turned off, there is a large number of glow-lamps fed directly from accumulators. This last feature is an excellent one. For the rest, it is probable that such complications of contrivance as are here described will only prove a source of confusion in the event of danger, and that such model theatres are of more interest as popular exhibits than they will ever be in practice.

THE thanks of architects and archæologists are due to the *Standard* for helping to spread a protest against the careless treatment of monumental brasses. The "restorer" is not always the Vandal he is painted; but

restorations are sometimes undertaken by ignorant or frankly "Philistine" persons, who sorely need to be reminded both of the reverence due to the monuments of the dead and of their real value as contemporary evidence of historic facts, and such persons are more easily moved by an article in a daily paper than by all the protests that have ever been made by architects and others who have a special knowledge of and interest in the matter. It may, however, be pointed out that one of the special acts complained of,—namely, the taking up of brasses from the pavement and placing them against a wall,—is frequently the only way to preserve them from being effaced by the feet of worshippers.

THE autumn issue of the "Mittheilungen" of the Athenian German Institute is, perhaps not unnaturally, a thin and somewhat meagre number. The Prussian military service had irrevocably claimed Dr. Dörpfeld (we hope for the last time) for the space of three summer months, and the result is that we have no architectural and topographical report from his hand. Dr. Wolters, however, gives an interesting provisional account of the discoveries in the dome-shaped tomb (Kuppelgrab) at Pali, which are to be published in further detail by the discoverer, M. Tsountas, in the "Ephemeris." Pending this publication, we may note that among the discoveries are several swords of the well-known Mycenæ type, forty archaic engraved stones, and, above all, two magnificent golden cups, elaborately wrought, on one of them a design of palm-trees and a cattle hunt, which promises to be of great archæological importance. Perhaps the paper of most general interest, however, is one by Herr Blümner; he publishes a vase found at Lokris, and now in the Archæological Museum at Athens, on which is represented the inside of a potter's workshop. The walls are hung round with shelves, on which stand vases of various shapes. The master of the shop is seated in the middle, and holds a cylix in the left hand; with the right he aims a blow at a retreating slave. One is tempted to hope the blow will not reach its mark, as the slave holds in his hand a number of drinking-cups piled one above the other. These he is carrying with as much dexterity as that with which a modern waiter balances a pile of plates. Worse, however, is going on at the right-hand side of the picture—an unfortunate slave is hung up by the feet and wrists to the ceiling, and in this position is being severely beaten.

SIGNOR GAMURRINI chose for the subject of his festal address on the anniversary of "Rome's Birthday" a very curious Etruscan monument from the Chiusi Museum. The address is published in the last issue of the Roman section of the *Mittheilungen* (1889, iv., fasc. 2), and the Etruscan *cippus* discussed is reproduced in phototype on Plate iv. The quadrangular monument is decorated on three of its sides with low reliefs representing scenes from the early Italian matrimonial rites. The principal representation consists of three figures, two men and a woman, over whose heads two attendants hold a large piece of fringed drapery. This is a very graphic presentment of the ceremony of *co-nubium*; the drapery is the *nubes*. The generation,—now rapidly passing,—that used to learn "Henry's Latin Grammar," were always taught—

Nubere is of the female said,
The English of it is to wed.

It appears from this monument that the verse only tells half the truth. The man, as well as the woman, when married, was most distinctly *nuptus, i.e.*, "under a cloud," and, it appears the bride's father also. Into his somewhat fanciful speculation as to the origin of the church ceremony, and as connecting with Neptunus (*Nu*ptunus), we will not follow Sig. Gamurrini. One end of the *cippus* is decorated with a scene from the other form of the marriage ceremony, the *coemptio*, and on the other side is a mixed scene of sport and tillage, which has not any very apparent meaning. Altogether, the *cippus* is well worth the attention of classical scholars and students of ancient custom.

WE have recently received the official report of the Third Annual Convention of the National Association of Builders of the United States of America, held at Philadelphia in the early part of this year. It contains some very able papers on various subjects connected with building, and the discussions include a great deal of interesting reading. The Association is to be commended for the enlightened interest which it appears to take in the education of building artisans. Their legislative Committee have presented a report on the best system of education for a man who is to be recognised as a "regular journeyman in the building trades," in which they recommend first, the serving of a regular course of instruction in a mechanical trade school; second, a term of practice with an employer on actual work; finally, "completion of the education of the mechanic to be acknowledged after a proper examination has been passed before a Board of Examiners appointed for the purpose by the Association of Builders to which the employer may belong," and the issue of a certificate by the said Association. The report concludes with a recommendation that this method be "persistently agitated," and that a Special Committee be appointed to have the matter in charge. The report was adopted by the meeting, and it is to be hoped they will be able to bring it to a practical issue.

SOME extensive repairs are about to be carried out at Abbots Langley manor-house, Hertfordshire, under the direction of Mr. C. P. Ayres, of Watford, architect, for the governing bodies of Trinity College, Oxford, and Sidney Sussex College, Cambridge. The village, otherwise known as Chiltern Langley, in Cashio hundred, lies near to St. Albans, on the eastern bank of the Bulbourne. According to Domesday survey, the demesne was given to the monks of that Abbey, whence its name, by Ægelwyn, surnamed the Black, and Wynifiehd, his wife. King John confirmed this grant wherewith to equip the monks with clothing. Having passed to the Crown at the Dissolution, the manor was conveyed by James I. to one Francis Combe, of Hemel Hempstead. Combe, having no children, provided by his will, dated in 1641, for the endowment of a school here, and devised this property to the two colleges for the education of his own and his wife's kindred in perpetuity. His wife Jane's effigy is in the parish church of St. Lawrence, which is supposed to occupy the site of an ancient English church, or chauntry, for the Survey speaks of a priest as in residence here. A nave and two aisles were added to the old chancel *circa* 1200; the chancel was rebuilt by Abbot John de la Mook in 1396-1401. Here is also a monument to Robert Raymond, Baron Langley, Lord Chief Justice of England, with a recumbent figure clad in judicial robes (1732). The church was restored and reseated twenty-two years since. Nicholas de Breakspear, who, in December, 1154, was elected Pope by style of Adrian IV., is commonly stated to have been a native of Abbots Langley; the place whence he took his agnomen lay within the adjoining parish of St. Michael.

AN illustrated essay on Haddon Hall, which originally appeared as an article in our columns, has been brought out by the author, Mr. J. A. Gotch, as a pamphlet.* The illustrations, most of which also appeared as accompaniments to the original article, are reproduced from pen drawings by Mr. T. Garratt. Under the circumstances, for us to specially recommend it would perhaps, in the words of Portia, "come too near to praising of ourselves"; but we believe those who are interested in Haddon, either because they have seen it or because they are going to see it, will find the sketches pleasant and correct memoranda of picturesque corners of the building, and Mr. Gotch's remarks interesting in style and archæological matter.

* London: Gotch & Gomme. 1889.

IN the last number of *L'Architecture* M. Boussard discusses, under the head of "L'Hygiène des Habitations," the question "Doit-on laisser subsister la respiration murale"? in other words, should we encourage porous walls as an assistance to ventilation? M. Boussard argues against it, on the ground that walls may contain much that may contaminate the air passing through them. He gives a noteworthy instance of this, in a case about which he was himself consulted, where the tenant of a costly apartment in a house in flats declared that he would have to leave in consequence of disagreeable smells which were perceptible from the adjoining property. The smell was perceptible in his apartment, and came from the wall; but it was *not* perceptible on the other side of the party-wall. The wall itself was examined and traces found in it of ancient contamination, which undoubtedly had caused the nuisance. It was only perceptible at night, owing to the suction of the air through the wall when the house was warm and the windows and doors closed. Taking out the piece of wall and rebuilding it with clean and impermeable materials, nothing more was perceived of the nuisance. The account is given as an argument against the opinion of M. Trélat in favour of permeable walls, on sanitary grounds. It certainly suggests another side to the subject which seems to have been rather overlooked.

THE *Daily Telegraph* is, or affects to be, incredulous with respect to a report that "ancient" water-pipes, made of the hollow trunks of trees, have been discovered in the Strand at some distance below the surface. The report has not reached us, but surely there is nothing in the least surprising in it, for, from the earliest until quite recent times, water-supply pipes, when there were any, were more often the trunks of elm or other trees, with the middle bored out, than anything else, and such a discovery as that reported would arouse but a languid interest among archæologists, even if the pipes were proved to be, what the *Daily Telegraph* rather hastily assumes them to be, relics of the Roman occupation of the country. It seems to us much more likely that they are some of the pipes laid down by Sir Hugh Myddelton for the distribution of the water of his "New River" in the early days of the seventeenth century, and which we are told were "of elme and lead, but for the most part of elme." Some of these pipes were discovered, as recorded in the *Builder* in 1871, in Gracechurch-street. They were from 8 ft. to 10 ft. long, and from 18 in. to 24 in. across at the thick end, the other end being trimmed off to fit into the next length. The bore varied from 6 in. to 9 in. in different places.

A CARD headed "Sanitary Hints for Householders"* has been brought out by Mr. G. M. Lawford, Associate Inst.C.E., which deserves the attention of those who wish to keep the sanitary apparatus of their houses in order. It is intended apparently to be hung up as a memorandum, and contains general directions to servants, and a list of certain precautions in regard to cleaning and inspecting traps, drains, &c., weekly, quarterly, half-yearly, and yearly. Some diagrams are appended to render the directions clearer. We strongly recommend this briefly-worded and useful memorandum to householders, as a reminder of things that are often overlooked and forgotten.

WE have received a third edition of Mr. Butterfield's pamphlet,† with a sectional illustration, on his form of kneeling-boards for church seating. In all he says as to the advantage of a fixed kneeling-board over hassocks which are always getting astray, and quickly wearing out, we are agreed; but we should still wish for some kind of durable

* London: G. Gill & Sons.
† Published by Rivingtons.

padding on the upper surface of the "kneeling-board." Nor are we by any means disposed to accept Mr. Butterfield's seats with absolutely vertical backs. A seat-back sloped backwards is more comfortable for every one while sitting, and for many persons—women not in strong health for instance—it is an absolute necessity: and we must decline to recommend the vertical back. From some parts of the pamphlet it would seem that it was a kind of virtue that people should be more or less uncomfortable in church. We certainly cannot see either the physical or spiritual advantage of this.

A THOROUGH CHANGE.

BY OUR IDLE ARCHITECT.

IT is written that to carry one's ordinary occupations into one's vacation is folly; that our annual "change" should be such in every sense, and not alone of air and scene. The wisdom of this dictum is apparent upon reflection. But Wisdom cries out in the streets and few regard her. We architects are, it is feared, great sinners in this respect, and not as other men. The lawyer, for instance, leaves behind him his drafts and indictments, and, seizing rod or gun, hurries off to enjoy himself as a gentleman should do. The doctor does not, we fear, reck his own rede, but acts as a "Locum," exchanging practice with his country brother. But that is the way with doctors, who are proverbially careless of the lessons they enjoin. We should, however, follow the better example, and not the worse, nor go for ever fussing about with our note-books and rules, poking our noses into every old building, when we ought to be better employed. For ourselves we will, regretting the follies of our youth, try for once another tack, and give the new doctrine of change a fair trial. But, first, can we find in this our dear native land a suitable district for our experiment,—one so architecturally uninteresting that our new-made resolution may not be put to a too severe test? We take a map and get at the sought-for spot by elimination. Yorkshire and its abbeys, Lancashire and its old halls, Northampton with its churches, are one after another banned; at last we get at a promising locale where the jaded architect may take his scanty fortnight's leisure without health-destroying incitements to professional study. Yes, we put our finger down with confidence and say, here, at least, we shall be free from allurement, and escape for a time from our besetting propensity. To make assurance doubly sure, we consult our Murray. It's all right. "There is absolutely nothing at Blankbury which will interest the archæologist." "The church is an unpretending structure, restored, or rather rebuilt, in 1837." Good! quite the right period for us. "Blank Hall was destroyed by fire in 1817, and the present house offers nothing which need delay the tourist." Excellent again. "A fragment of a former gateway at the entrance of the Park, said to have been designed by Inigo Jones, or *one* of *his* pupils(!), should, however, be seen." Should it! Thank you—not in our line. We are resolved. We will incontinently visit this delightful spot. Nor book nor pencil will we take, nor pocket-rule nor compass, and we will resolutely clear our mind of shop and all its associations. To drive to Euston, fling ourselves into one of the cosy smoking-carriages of the Wild Welshman, and alight at a certain station, was—as the late Mr. G. P. R. James would have said—the work of a moment. A drive of a dozen miles along sharply undulating roads, and here we are. Truly, it looks as though the architect had never found his way hither. Not a glimpse of church or hall, snug homestead, or cosy cottage. "Barren, barren all, Sir John!" The houses which dot the mountain-sides and cluster in the valleys are mere rectangular blocks, with slate roofs and whitened all over. Even the village smithy has no picturesqueness. What could be nicer? Oh, most veracious Murray! Fate sets us down at the door of a painter who has chosen to make his home among the mountains. It is a humble dwelling, rectangular like the rest, and like them whitened all over. A monthly rose blooms over the doorway; not a Tudor rose, or we could not have rested here without jeopardising our resolution. It appears that our friend's house is the centre of a little community of artists, who inhabit the small farm houses and labourers' cottages cast about the hill-sides—a simple folk, to fortune and to fame unknown, who devote their placid lives to art. You meet them in the twilight coming homewards, like the bees, laden with spoil from heath and wood—stalwart figures bearing jauntily their freight of canvas, easel—what not? after their long day of happy work. An ingenuous race! content if they can catch some passable likeness of the beauty which everywhere surrounds them, and ready with sweet alacrity to show you all their work. The only red roof in the valley—near the poplars—covers a club they have built for themselves, where, during the long winter evenings, they study, from the not too-lively life, rustic models of all conditions. Here, too, they hold high jinks now and again, when ——, who has a marvellous tenor voice, or ——, who sings a capital comic song, comes to visit them. And here, four times a year, they give a dance, which form of amusement has been artfully thrown in to disarm the criticisms of the wives, who, left alone with their children and stitching, have doubts about the expediency of clubs in general, and suspicions as to the kind of study which goes on at this particular one. Our host is president, and we are introduced to the members,—the bashful genius; the funny man, who plays the banjo, and knows all Moore and Burgess's jokes; the wealthy amateur, who is considered but half an artist, because he is not "hard up." There was "nothing going on" just then, and we would rather die than attempt to describe what we have not seen. But the company drop in casually, one by one, at our host's, whose hospitable doors stand ever open to all comers. We are a silent member at those frequent jolly gatherings, but it is possible to take notes without a note-book. Our anti-sketching virtue undergoes a little trial in this the only sitting-room of the house, half kitchen, half hall, wholly snug and comfortable,—the sort of room, indeed, which our semi-Bohemian tastes have always declared for. It is long and low, with a vast cavernous fireplace at one end, across the head of which run two shelves displaying brass candlesticks of supernatural lustre disposed amongst a litter of really old china. Ceiling there is none. The joists are honestly shown, and hooks upon their sides carry whips and sticks, and all sorts of picturesque odds and ends. An internal wooden porch projects far enough to make a bay for the great oak settle placed under a long range of casement lights high up and screened by the transparent green of a trailing vine. A fixed buffet, a grandfather's clock, a high-backed chair, are opposite, and everywhere pictures, pictures, pictures. At the end opposite the fire is a noble piece of furniture for which we have no name. It is partly sideboard and partly cupboard, and full of queer shelvings and recesses. It is of oak, blackened by age, and bears the letters R.I., and the date 1686. On its shelves and odd, nameless coigns of vantage, gleaming plate and glowing china are ranged, and the whole is a painter's study. The balusters,—good, substantial things, not like their attenuated modern imitations,—have just a sufficient family resemblance without being too exactly alike, and the great, bulbous corner legs are simply grand. Our fingers follow affectionately their contours, and moulded neckings, and find a joy in them which no mere painter can understand. If we had only a pencil stump and the back of an envelope! But stay, this is dangerous ground. We feel something of the old feeling creep over us, and desist. "Virtue endangered makes a stern resolve." The fire burns the brighter for the deepening twilight, and the lights flicker upon the nubbly parts of the old oak and play round its bright burdens. On one side of the receding fireplace sits our host, "the general," as he is called,—his white head and beard standing out Rembrandtesquely from the dark background. On the other sits the painter's daughter,—young and pretty (gentle reader, we are old and discreet),—ruddy of head, a mountain child,—the sharp clicks of whose knitting-needles form an accompaniment to the old painter's stories of rough times in the mountains,—how the sudden swirls of wind have torn his canvas from his easel and planted it on his back, or the waters have washed him at midnight clean out of his humble tent! A lamp shining from the joists overhead gives just enough light to read or sew by at certain spots, and does not search with vulgar scrutiny every cranny in the room, like our unbearable London gas. One by one the guests drop in, and all their talk is of art. How ——'s picture is sold, and —— s on the line at Liverpool, and what —— and —— are doing for next year's shows. We find that, as a rule, they think meanly of the recognised heads of their profession, and are fairly well satisfied with themselves. One of them, who is clad in a velvet knickerbocker suit, with crimson stockings, and flowing amber tie, is an impressionist, it appears, and has good-naturedly brought in some sketches. "Blots, sir," he says, "merely blotted in for effect. This one, 'Firework Display on Jubilee Night,'—done, as you perceive, while the rockets were exploding. This, 'The approach of the military band and flags on the recreation-ground,' was knocked off in three minutes, as you will see noted upon it. Merely blotted in. *Some day* I shall *paint* this." It seems that he never does paint anything, but has in contemplation whole galleries of important works. "I shall paint this grand old valley, Sir, some day, with one broad, nervous sweep of a full brush." The younger hands argue with him, and meet with desperate falls, for he has read twice as much and can talk infinitely more and better than they. The older ones listen, and look archly across to each other in the pauses of the white clouds which escape from their silent lips. He is a dear good creature,—quite harmless, generous to a fault, and by far the handsomest ornament the club can boast. He tells us we really must see a church only three miles off, built, he is informed, by Harold! and *most* interesting. We explain that anything that is interesting has no interest for us, and thank him for the warning. To the Club children in arms are not admitted,—which is strange,—for children only just out of arms appear as full-blown painters here. There is young Slick, only seven! You see him in the morning, brushing with hasty steps the dew away, and struggling under the usual professional load,—easel, white umbrella, canvas, &c. A dwarf you think, until he gets nearer, when you perceive that he is little better than a baby, his blackberry-stained mouth in strange contrast to the professional character of his burden. Oh! a boy carrying his father's "things!" Not a bit of it. He, too, is an artist. Only been painting a year and a half, and knocks off the local scenery like winking. Gets 15s. for his *large* pictures, including the frame. "Safe to be at the top of the tree before long," &c. Talking of trees, did ever any one see such foliage as this valley spreads out before us in this divine September weather? We have watched the picture grow. First the wild cherry burst out like flame in its setting of dark pine. Then the ruddy tips of the oak and the golden blaze of the ash followed, and everywhere the stately beech glows with exuberant crimson and brown; and all the woodlands shout for joy. The deadly nightshade in the banks, and the wild bramble in the hedges, should be framed and glazed, and the scarlet hips be strung as jewels for my lady's neck. The mountain torrents leap and tumble down a hundred glens, "eddying in palpitating light," and lingering in darksome pools about the weather-worn boulders, on which the lonely robin sits and pipes its solitary note. "Is not this our life more free from care,"—and colds,—than if spent as of yore in measuring musty old churches with their melancholy old monuments? Out upon them! Rest you, brother architects, we will not measure more,—that is, in holiday time. Our experiment has been entirely successful.

We bid adieu to our genial artist friends and return to our desk re-created indeed, a new man, wiser but not sadder.

> "O for one hour of youthful joy!
> Give back my twentieth spring!"

No! we cannot, alas! recall our mis-spent youth, but we can resolve that in future our holidays shall be holidays, *pur et simple*, and we urge upon our younger brethren to work while they work but play while they play, and not to take either *mixed*, if they would get the full benefit of both. B.

"**Turbines.**"—In the article on this subject in our last, in the third column of page 166, line ten from bottom, for "section-tube" read "suction-tube."

"**The People's Hall," 272, Whitechapel-road,** is being converted into a Food and Shelter Depôt for General Booth. The work has been let to Mr. A. Martin, builder, Battersea, Mr. J. Williams Dunford being the architect.

House, Lenox, Massachusetts.—Messrs. Peabody & Stearns, Architects.

RESIDENCE, LENOX, MASSACHUSETTS.

THIS house is designed by Messrs. Peabody & Stearns, architects, of Boston. The basement and piers are of white marble from local quarries; the upper walls and roofs covered with stained shingles. In the interior the dining-room is finished in oak; the library in cherry-wood; the remainder of the rooms in pine, painted.

The marble was used as the cheapest local stone, and not for effect.

NOTES FROM ITALY.

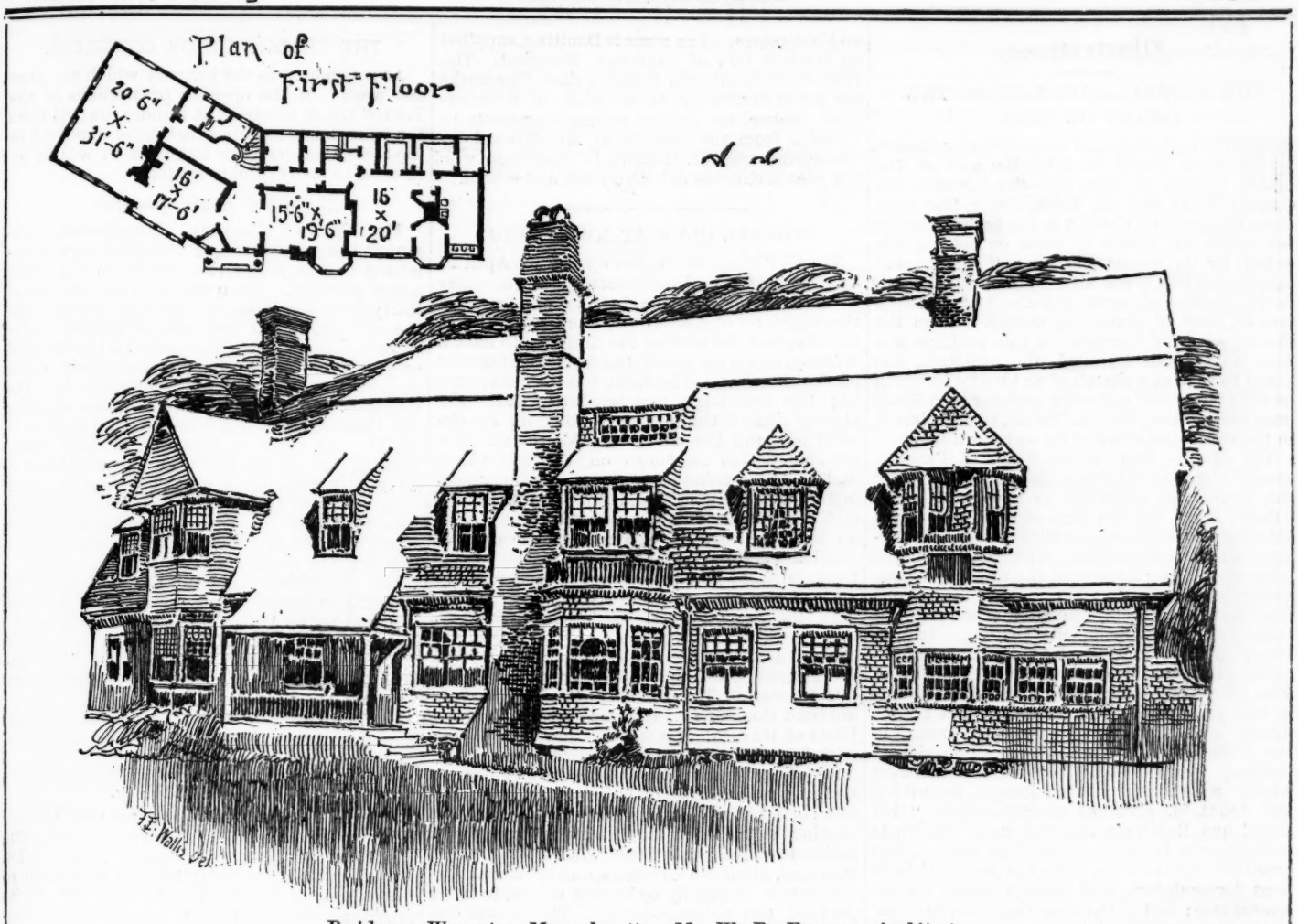
COUNT SACCONI, the architect who has planned the monument now being erected on the Capitol to King Victor Emanuel II., is superintending some very important repairs in the Church of St. Cyriac of Ancona (an edifice of the eleventh century, in the Byzantine style), and in the famous shrine of Nostra Signora of Loreto. The basilica, or holy house of Loreto, is built in the Gothic style of the fifteenth century, with battlements on the outside, in order to be turned, if required, as it often was, into a fortress. In the sixteenth century it was transformed by Sangallo in the Roman style. Count Sacconi undertook the difficult task of returning it to its primitive state, namely in the Gothic style.* It was a bold undertaking, but he contrived to surmount all obstacles. The arches, which ruined the stateliness and elegance of the ancient architecture, have mostly been demolished, and the slender and harmonious lines of the Gothic style can again be seen. The cupola, which was very nearly coming down, has been repaired by Count Sacconi by means of an invisible chain net-work; while the paintings have been confided to Prof. Maccari, well known both in Rome and abroad, for his beautiful frescoes of the Senate-hall in the Piazza Madama. The repairs executed in the chapel of St. Joseph, on the right-hand side of the church, deserve particular attention. This chapel, which was the best preserved of the ancient church, has suggested the type of all the others, and the repairs, although not yet brought to an end, are really magnificent. Four large fresco pictures are being painted on the walls, illustrative of the life of St. Joseph, and underneath are four allegorical figures surmounted by canopies, and representing Work, Faith, Obedience, and Justice. We owe the paintings to Prof. Faustini, and the decorative part to Prof. Stella, both citizens of Venice.

We must also bestow a glance of admiration at the stately altar, planned by Count Sacconi and executed by the sculptor Signor Maccagnani, and by the Roman intaglio artists, Prosperi and Benni.

The stained glass windows made by Francesco Moretti, of Perugia, are also very beautiful. The artistic iron grates are praiseworthy works of Mattacotta, of Fermo, who has made the large gratings of the chapel in the same style. Many other important repairs are being completed, such as a large window, by Signor Scettica, of Arezzo, with the help of Signor Basili. The repairs and covering of the cupola were confided to the Venetian Arturo Biondetti, who had before gained some renown by his repairs of the Ducal Palace and of the Church of the Salute in Venice.

A very interesting book has been lately published by Signor Ongania, the well-known editor of the splendid work on the Basilica of St. Marc, in Venice. The book was written by Prof. Raffaele Cattaneo, and is entitled "Italian Architecture from the VI. to the XI. Century: Historical and Critical Researches." It is enriched with many engravings, representing the principal monuments mentioned by the author in the course of the work. The subject of the first chapter is the Latin-Barbaric Architecture, which flourished from the sixth to about the eighth century. Some famous marble sarcophagi in the church of St. Apollinare, in Ravenna, and especially the one of the Archbishop St. Felix, are studied in the chapter, together with the pulpit of the Church of St. John and Paul. The only remains of Byzantine art now to be seen in Rome are in the Church of St. Stefano Rotondo, and in some parapets and other details in the Churches of St. Clement and St. Lawrence. The author subsequently examines and compares the sculptures in the Cathedral of Santa Maria in Grado. Prof. Cattaneo's opinion is that all these works of art were executed during the sway of the Lombards. In the second chapter the author draws the attention of the reader to the Barbaric-Byzantine monuments, such as the parapets, or rather the *pluteus*, of St. Marc, the Baptistery of Cividale, in the province of Frinli, famous for its altar by Ratchis. The Church of Santa Maria in Valle in Cividale, also possesses some remarkable pieces of sculpture of this period of art, to which we may also safely attribute the monuments in the

* We give the statement of our Italian correspondent as a piece of news, "without prejudice," as the lawyers put it. Probably most English readers will think Count Sacconi might as well have let it alone. The exterior as it recently existed was at all events "real Sangallo," which is something: what it is after the operations here described it would be rather difficult to say.—ED.



Residence, Worcester, Massachusetts.—Mr. W. R. Emerson, Architect.

Church of S. Salvatore, in Brescia, as also those in Theodora's tomb in the City of Pavia. These works were mostly executed under the superintendence of Greek artists, and the author proves this theory by comparing these sculptures to those of the Athen's Cathedral, of the Church of Belish, in Syria, and of the Castle of Safa, likewise in Syria. This period of art was followed by one in which we can clearly see the Italo-Byzantine style, viz., imitations of Greek artists by Italian ones. It flourished in Rome principally under the Pontiffs Hadrian I. and Leo. III. To this period we owe the Churches of S. Maria, in Cosmedin, S. Saba, S. Prassede, as also some sarcophagi in the Church of St. Apollinare, in Ravenna, and some sculptures in the Churches of St. Michel, in Capua, St. Ambrogio, in Milan, and St. Vincent, in Prato (Tuscany). The book finishes with a chapter on architecture in the Lagune and the Province of Venice from the year 976, by order of the doge Peter Orleolo I. (a. 976).

This book does honour to its author, and will, doubtless, meet with a hearty reception both in Italy and abroad by the lovers of ancient art, history, and especially Italian art. L. B.

Plumbers' Work.—At the Municipal Buildings, West Hartlepool, a few days since, the Mayor (Mr. Alderman G. Pyman) held a meeting to present certificates of registration to plumbers in the district. He expressed his strong sense of the importance of the action taken by the Plumbers' Company to improve the workmanship of plumbers, and referred to the necessity for apprenticeship. Dr. Gourley, Medical Officer of Health, said that his professional duties convinced him of the necessity for plumbers' work being carried out by thoroughly qualified men. Mr. Barrett, head-master of the Athenæum Science Class, advocated the establishment of a special class for instructing plumbers in the theoretical as well as the practical branches of their craft, and he referred to the action being taken in the matter by Mr. L. Robson. Councillor Armour, Secretary of the North of England Registration Council, attended, and explained the steps which are being taken by the Plumbers' Company to give effect to their desire to impart technical and scientific education to plumbers, in addition to a thoroughly practical knowledge of their trade.

RESIDENCE, WORCESTER, MASSACHUSETTS.

THIS is an illustration of a house erected from the designs of Mr. R. W. Emerson. The lower story is built of "field stone," the walls and roof being shingled and stained. In the interior the first story is finished in oak, ash, and cherry, and the second story in stained pine.

LIVERPOOL AUTUMN EXHIBITION.

OWING to the disagreement of the Town Council last Spring respecting the purchase of Sir Frederick Leighton's "Captive Andromache," it was at one time doubtful whether there would be any exhibition at all this autumn. However, the Liverpool Corporation inaugurated their nineteenth annual gathering last week, with a collection of pictures of more than average excellence. It includes not only some of the best pictures from the London 1889 Exhibitions, but also very agreeable and interesting works from the studios of France and the Low Countries. The local artists show well to the front.

Figure subjects and portraits comprise the most notable exhibits. Mr. Orchardson's "Young Duke" occupies the place of honour. Mr. Kennedy's "Neptune," Mr. J. M. Swan's "Prodigal Son," Mr. Halswelle's "Blasted Heath," and Mr. Goodall's "English Landscape" (a new departure) may be singled out for their worth. Much cleverness is displayed in the portraits in this collection. Amongst them may be found those of two architects, Mr. E. R. Robson, by Mr. C. E. Halle, and Mr. Edmund Kirby, by Mr. Percy Bigland.

This year sculpture has been encouraged by an improvement in the manner of its display. Formerly, in passing through the picture-galleries, one used to stumble against a plaster or marble group, and be thankful to have escaped injuring and injury. Now the sculpture exhibits are all arranged together in the same room. The Committee's favours have, however, been turned from Architecture, whose contributions may be seen hanging on the entrance staircase walls,—a situation where, we are sorry to say, a careful study is impossible. Perhaps the quality of the works submitted has had something to do with the selection of so inferior a place for their exhibition.

There are one or two drawings by London draughtsmen which have already been noticed in our Royal Academy criticisms. The rest, with one or two exceptions, are of a poor description: the defective perspective in one is so glaring as to cause astonishment at its acceptance. If the Arts Committee were less tolerant, and fearlessly rejected all incompetent work, their exhibition probably would include not only London and other provincial works, but also representations of the best local architecture.

Glasgow Architects and the Royal Scottish Academy Charter.—Last week a meeting of architects was held in the Religious Institution Rooms, Glasgow, Mr. J. Gordon, President of the Glasgow Institute of Architects, in the chair. In opening the proceedings the chairman explained that the meeting had been called for the purpose of considering what action, if any, should be taken in view of the application of the Royal Scottish Academy for an amended charter. That body, as they were probably aware, was founded in 1838, ostensibly for the advancement of painting, sculpture, architecture, and engraving. How far it had served its purpose in regard to painting was a question for painters to determine. In respect, however, of architecture, he thought they were pretty well agreed that its action in the way of advancing architecture had been nil. After fully fifty years' existence the Royal Scottish Academy was now applying for an amended charter, with additional privileges. It was thought, therefore, that the time was suitable for endeavouring to secure a fuller recognition of the claims of architecture by that body, and a better representation of architects in its membership. How these were to be secured was a question they had not met to determine. The architects of Edinburgh were moving in that direction, and he believed they had appointed a committee. The present meeting had been called to consider whether a committee of the Glasgow architects should be appointed to associate with their friends in Edinburgh. The discussion took place in private, but it was ultimately agreed to adopt the suggestion of the chairman, and a committee was appointed to co-operate with Edinburgh architects.—*Scotsman.*

Illustrations.

THE CENTRAL FOUNTAIN ON THE CHAMP DE MARS.

THIS ambitious and somewhat tumultuous work, which occupies the axis of the Champ de Mars half-way between the Central Dome and the Eiffel Tower, like some other things in its vicinity is not perhaps in the best taste, but atones to some extent for this defect by its remarkable life and vigour; and considering that it was all designed and executed in the space of eighteen months, it is really a *tour de force* of sculptural ability. When the idea of a central fountain for this position was first mooted, M. Formigé, the architect, was asked to furnish a sketch of an idea for it, which he did; but it was not every sculptor who would have undertaken, like M. Coutan, to complete it in the short time allowed for so large a work.

The idea is that of the figure of Progress carried along on the ship emblematical of Paris; the figure was originally to have represented "Paris" itself, but the idea of "Progress" was afterwards substituted, as wider and more suggestive in its associations. The meaning of the trumpet-blowing figures on the prow is obvious enough; the other figures round the central one represent Art, Agriculture, Commerce, and Industry; at the helm sits the Republic in a Phrygian cap; and at the prow may be observed the Gallic cock in very full crow. The figure tumbling backwards off the ship, in the foreground, is "Ignorance"; a female figure on the other side (not seen in the illustration), thrown overboard in similar fashion, symbolises "Routine," concerning whom a French contemporary, describing the fountain, exclaims parenthetically "Bon Dieu! que Routine a des charmes!" which is perhaps true in more senses than one. These tumbling figures form a far too *prononcé* incident for sculpture, and have a rather absurd appearance; and of the commonplace character of the fat women on dolphins round the edge of the basin we have before spoken: whether M. Coutan is also responsible for these we do not know: probably not; they belong to the ornamental gardening style of sculpture.

The whole group is no doubt wanting in repose and harmony of line for a piece of monumental sculpture; but it is redeemed by its great vigour and spirit of action and expression; and as a work produced on short notice and against time it shows a power of improvisation that is truly remarkable.

WINDOW, DREW THEOLOGICAL INSTITUTE, NEW JERSEY.

THIS window, designed by Mr. Henry Holiday for the Library of the Drew Theological Institute at Madison, New Jersey, was described in a "Note" in a previous number (page 151, *ante*). The idea, as then described, is to represent "Theologia" as enthroned in the centre of the composition, with moral virtues and intellectual powers grouped around in the outer part of the circle, while Humility occupies the central position below, as leading the young up to the knowledge of God. Taking the word "Theologia" in its widest and deepest meaning, the conception is a fine and a true one. Of the composition the reader can judge for himself; we wish we could enable him to judge of the colour, which is very fine and harmonious. The centre portion of the window is the richest in colour, the draperies of the side figures being kept in rather lower tones even in the warmest portions, so as to give climax to the centre.

The drawing is reproduced from Mr. Holiday's full-size cartoon, from which the window has been very well executed by Messrs. Powell & Sons.

CHAPEL AND SCHOOL, BECKENHAM.

THE Chapel, which was built some four or five years ago, was won in a limited competition, the design including the school-building.

A different building committee being now in existence, the design for the latter has been considerably revised. The plan now consists of central hall, with class-rooms on three sides, the hall being lighted by windows above the level of their roof. A church parlour, with separate entrance, vestries, &c., are also provided.

The materials used for the walling are stock bricks, with red bricks for the arches, quoins, and buttresses. The stone is Doulting, supplied by Trask & Co., of Ilminster, Somerset. The roofs are covered with Broseley tiles. The works are being carried out by Mr. Kick, of Bromley-road, Beckenham (whose estimate amounts to 1,650*l.*), from the designs of Mr. Edward W. Mountford and Mr. Herbert D. Appleton, who are joint architects of both church and school.

LIBERAL CLUB AT KETTERING.

THIS building, which was opened on April 27 by the Right Hon. Jas. Stansfeld, M.P., occupies a commanding position in one of the chief thoroughfares of Kettering. The irregularity of the site, and the wish of the directors to have a balcony, gave rise to all the principal features of the structure. The front was set back, leaving the two large bay windows, while the sloping line of the side gave room for the circular bay, and the octagonal side turret. The accommodation is shown on the key plans, and includes refreshment-room, reading-room, lecture-room, billiard-room, and lavatories. In addition to this there is a second billiard-room on the top-floor, as well as store-rooms and another lavatory. At the back of the club is the caretaker's house, one room of which serves as a cloak-room or green-room, in connexion with the lecture-room, where entertainments will occasionally be given.

The materials used are red sand-brick and Weldon stone, all the moulded work being in the latter material. The first-floor and the upper floor are both double, *i.e.*, the ceiling has separate joists of its own. These floors are also pugged with 3 in. of coke-breeze concrete between the floor-joists. These precautions are found effectual, and prevent the noise of dancing in the lecture-room being heard in the refreshment-room. The heating is by open fires, supplemented by a delivery of warmed fresh air into the hall, staircase, ground-floor rooms, and lavatory. The ventilation is mainly by upcast shafts, forming part of the chimney-stacks. The shafts are merely covered over on top, and have wire netting over their openings, which are in the side. There has always been a good up-draught whenever tried. Kite's inlet ventilators are used in all the rooms, and the upper billiard-room has two of Kite's extractors. The stone windows have iron casements and fixed lights, except in the case of the large sheets in the front bay windows, which have solid wood frames. No alcoholic drinks will be sold, nor is the club likely to be used much for substantial meals, except on market days; all the necessary cooking, therefore, will be done in the caretaker's house.

The contractor is Mr. E. Barlow, of Rothwell, whose tender amounted to a little over 2,000*l.*; the sub-contractor for the plumbing work being Mr. E. Nicholls, of Northampton. The architects are Mr. J. Alfred Gotch, F.R.I.B.A., and Mr. Chas. Saunders, Kettering.

HOUSES AT SNARESBROOK.

THESE houses are now being erected on the Grove Estate, near Snaresbrook station, Essex. Each plot has an average frontage of 50 ft., with sufficient depth for tennis-lawn and garden in rear of house, whilst the roads are wide, and are to be planted with trees at the edge of the footpath.

The accommodation consists of four bedrooms on the first-floor, with bath-room and w.c., &c., over which is an attic bedroom, and a large room in roof, about 38 ft. by 18 ft. and 10 ft. high, suitable for a billiard-room, and with lights arranged to suit the table; or, in a family, where such a room is necessary, it would make a play-room for children.

The materials used are,—for the roofs, brown Broseley tiles, the gables being hung with bright red tiles; the exterior of the first floor is rough-cast and half-timbered, with the ornament shown modelled in cement; the facing bricks of the lower part are red Suffolks.

The houses are being carried out from the plans and under the superintendence of Messrs. Potts, Sulman, & Hennings, architects, who are also laying out the estate.

School, Southborough (Kent).—It is proposed to build a mixed school at High Brooms, Southborough, near Tunbridge Wells, for the accommodation of 250 children, the building to be of local bricks, with terra-cotta dressings. Messrs. Brett A. Elphicke and Albert Howell are the architects.

THE TRADES' UNION CONGRESS.

As a pendant to the account which we gave last week* of the opening proceedings of the Trades' Union Congress at Dundee, we cull from the voluminous reports which have appeared in the Scotch papers a few items which will be of interest to many of our readers.

The Eight Hours' Question.

Mr. James Maudsley, Manchester, presented the report of the Parliamentary Committee on the vote of the trades on the eight hours' question. There were only, he said, some thirty-three societies which had made returns on the subject. That was not altogether satisfactory, especially as these societies represented only 169,540 members, a comparatively small proportion of the Trade Unionists in the kingdom. In favour of an eight hours' working day there voted 39,629 members, and against it 62,883. Of those in favour of an eight hours' working day, 28,489 had voted for obtaining it by Act of Parliament, and 12,274 for securing it by the trade organisations. Taking the total vote as 102,512 out of the 169,540 recorded, he found that the majority against an eight hours' working day was 23,254.

Mr. Birtwhistle, Accrington, said that the minority in favour of an eight hours' working day had to be reduced by 9,000, because the Ayrshire Miners' Union, which was returned to Congress as having 1,000 members, had recorded 10,000 votes in favour of an eight hours' working day.

Mr. Keir Hardie said that they had 10,000 miners in Ayrshire, and they simply had taken their votes upon the question.

Employers' Liability.

Mr. E. Harford, secretary to the English Railway Servants' Society, moved the following resolution:—"That this Congress is of opinion that the Employers' Liability Act should be so framed as to prevent contracting out of its provisions, place no limit to the amount of compensation recoverable, or require notice of injury to be given by the *employé*. It, therefore, instructs the Parliamentary Committee to prepare a Bill embodying the foregoing provisions." They would, he said, be satisfied with nothing less than an Act out of which employers could not contract themselves. They were averse to that specious legislation which pretended to give with one hand while it took away with the other. Some of the provisions of the Government Bill of last session were of the most objectionable character. A great deal was said about freedom of contract; but where was it to be found when a man must either work or starve, and when an employer had the power of saying that he could give employment, but that it was of a risky and dangerous character, and the workmen must insure against any accident? They were not in favour of litigation for the purpose of securing compensation. What they wished was due provision for the prevention of accidents, and he was pleased to say that those railway companies which had not contracted themselves out of the Act had made greater provision for the safety of their workmen, while those who had availed themselves of insurance schemes had not been so careful of life and limb.

Mr. J. H. Wilson, Sunderland, seconded the motion.

Mr. Johnstone, Durham, moved as an addition to the resolution—"That this Congress approves the action of the labour members in opposing the Bill of last Session." They should, he said, repudiate Mr. Bradlaugh and men of that stamp, who represented themselves as the champions of the working classes.

Mr. Purdie, Edinburgh, supported the extension of the Bill to seamen, who had, he said, been shamefully neglected in the past.

Mr. Harford accepted the addition to the resolution, and it was unanimously agreed to.

Labour Representation in Parliament.

Mr. T. R. Threlfall, Southport, moved the following resolution:—"With the view of furthering the representation of labour in Parliament, this Congress instruct the Parliamentary Committee to render every assistance in securing the passing of a measure. First,—For the payment of Members of Parliament by the State. Second,—For the payment of the returning officers' expenses at elections from the local rates. Third,—We further recommend that, wherever practicable, labour organisa-

* See p. 176 *ante*.

tions should take advantage of every opportunity of aiding in securing direct labour representation in Parliament, also in Town Councils and other local bodies." In speaking to the resolution, he said they might complain about their grievances till Doomsday, but until they sent men of their own class to the House of Commons it was useless to expect any thorough reform. Great and important progress was being made, but the labour movement must be kept in the hands of the trade unions, and not be left to those who might use it for their own purposes. State payment of members did not form an important item on the programme of either political party, but if the trade unions were true to their convictions it would soon go upon the political programme. It was not, in the ordinary sense, a party question. Both sides were afraid of it because it struck against the interests of the classes and favoured the masses.

Mr. Wilson, Sunderland, in seconding the resolution, urged that not only in Parliament, but in Town Councils, they should have more representation, and they should also have a larger number of labour men as magistrates on the bench.

Mr. Henry Tait, Glasgow, said the Durham miners had shown them how labour representation in Parliament could be maintained, and if they followed that example they would act more beneficially than in passing a resolution calling for State aid. What he proposed was that a fund should be formed at that Congress for the purposes of labour representation in Parliament, to be at the disposal of the Parliamentary Committee, who, along with the Congress and that Committee, would decide where candidates should be run. He indicated that he had little sympathy with some parts of the platform of the labour party, of which Mr. Keir Hardie was a member; and maintained that if they returned members of Parliament instructed on the views of the Congress, they would go far to lessen the influence of outsiders who aspired to be leaders of the working men.

After a long discussion, the motion was adopted.

Certificates for Engine Attendants.

Mr. J. Swift (Manchester) submitted the following resolution:—"That this Congress is of opinion that no person should be placed in charge of steam engines or boilers (sea or land) who has not undergone an examination to prove his practical fitness for such employment, and instructs the Parliamentary Committee to render all the help they can to secure legislation in this direction during the coming year." He said that a competent engine or boiler attendant would be able to discover and point out defects which to the mind of a man without knowledge and experience would present no danger and receive no notice. Were all engine and boiler attendants duly qualified, the number of accidents and explosions would decrease.

Mr. T. Ball (Leeds) seconded the resolution on behalf of the enginemen of the United Kingdom. It was supported by several speakers, and adopted.

Factory and Workshop Inspectorships.

Mr. W. Inskip, Leicester, moved:—"That in view of the evidence adduced before the Lords' Commission on 'Sweating,' together with the facts that in factories, mines, and upon railways inefficient inspection takes place, it be an instruction to the next Parliamentary Committee to take the necessary steps to bring the following before the Government of the day:—That this Congress is of opinion that the present evils of the 'sweating system' have been brought about mainly by the inadequate way the Factory and Workshops Act has been administered, and that a further number of practical working men be appointed as inspectors of factories, workshops, mines, and railways." He said that the disclosures made at the Sweating Commission proved the necessity for an increase in the number of inspectors. People were amazed at the increase of "sweating" and the want of proper inspection. It was for the Congress to insist that a larger number of inspectors should be appointed, and he was convinced that that would go far to secure the amelioration of the working classes specially affected.

Mr. Fenwick, M.P., said he would second the resolution, provided there was added after the word "administered" the clause—"also, seeing that the Shop Hours Regulation Act of 1886 has failed to accomplish the object for which it was passed, owing to the fact that no authority is responsible for the enforcement of its provisions."

Mr. Inskip said he would accept the addition, as it went in the direction of demanding that more working men should be appointed as inspectors.

Miss Whyte (London) was understood to move an amendment to the effect that women inspectors should be appointed where women were employed.

Eventually the resolution, thus amended, was adopted.

Labour Legislation: The Eight Hours Day.

Mr. Keir Hardie then moved:—"That this Congress instructs the Parliamentary Committee to take action on the following resolutions:—(1) The passing of labour legislation being a necessity in all countries to meet the industrial development of recent years, and to prevent further physical and moral degradation of the workers, the Congress proposes the following as a basis of such legislation:—(*a*) The maximum working day for all trades to be eight hours. (*b*) Prohibition of the industrial work of children under fourteen years of age, and restriction of the work of young persons under eighteen years of age to six hours per day. (*c*) Prohibition of night work, with the exception of those industries in which continued work is an absolute necessity. (*d*) Prohibition of the employment of women in such industries as are known to be specially hurtful to the female organism. (*e*) Absolute prohibition of night work for women and young persons under eighteen. (*f*) A rest of at least thirty-six uninterrupted hours each week. (*g*) Prohibition of such industries and such modes of production as are specially injurious to the worker. (*h*) Proper inspection of all working places where industrial work is performed, domestic industries included, by a sufficient number of inspectors paid by the State, of whom at least the half must be nominated by the workers themselves. (2) The Congress further declares that these reforms can only be finally established by legal enactment, though much may be done to advance them by the ordinary trade union methods. It therefore calls on the workers to organise politically and industrially, so as to realise these reforms soon. (3) That the Congress declares it to be the duty of all workers to support the Swiss Government in its desire towards an International Congress of the Governments of the world, in order to formulate international treaties for the better protection of labour. (4) The Congress approves of the proposal to make May 1, 1890, a universal holiday on which to hold mass meetings in furtherance of the eight-hour working day." In speaking to the resolution, he said he had attended the Paris Congresses. Those who attended these Congresses came from all parts of the world. Some of the delegates were trade unionists, some were members of political labour parties; nearly all were socialists,—though there were some who were not. He wanted to read to the Congress what Socialism became in the hands of international Congresses practically composed of Socialists. The resolution he submitted was just the programme of the Congresses to which he had referred. He suggested that the whole of that resolution, with the exception of subsection A, be either deleted or left over until they had decided what action that Congress was prepared to take upon the question of an eight hours' day obtained by legislation. That would simplify matters very much, and they would have a full and fair discussion on the eight hours question. Then he was prepared to agree that the other parts of the resolution should be voted upon *seriatim*. Proceeding to deal with the merits of the question, he said the argument with which they were met in advocating an Eight Hours Bill was that it would so affect their trade and so increase the cost of production that it would be impossible for this country to compete with Continental nations. He was quite aware that competition with their continental neighbours grew keener every year, and that so long as peace continued it must grow keener; but he would have them remember that on the Continent the principles of his resolution were making rapid progress. Judging by the signs of the time,—especially by recent declarations in Germany,—he feared that Great Britain was not to have the honour of setting an example to the other nations in the matter of shortening by legislation the hours of labour of the workmen. The problem of the age was how to dispose of the surplus labour at present in the market. A great army of men whom no man could number were ready to take their places in their workshops if a dispute about wages should arise. Emigration would not remedy the evils complained of in this connexion, neither would the nationalisation of land. The reform he advocated—an Eight Hours Bill—could be obtained from Parliament in a fraction of the time it would take to bring about the nationalisation of land. Why did their men work long hours? It was because they were compelled to do so. If all men joined the trade unions they would not require to go to Parliament for that reform. But all men would not join the unions, and as the trade unions suffered, they, in self-defence, were bound to seek legislative authority to help them.

Mr. Cronin, Glasgow, in seconding the resolution, said the question was one which they had to face, and he believed the proposal to establish an eight-hour working day would be carried into effect. It had been said that this was a Socialistic question, but it was nothing of the kind. It was every day taking deeper root among the working classes, and the sooner it was taken up by the trade unions the better. If it was allowed to drift into the hands of Socialists, they would have themselves to blame.

Mr. Harvey, Derbyshire, complained that the result of the ballot on this question had not been printed for the information of members, and said there was an idea that the question was being burked.

An explanation of the delay in getting the printing done having been given on behalf of the committee, it was agreed to adjourn the discussion till to afternoon, with the view of endeavouring to get the details of the voting officially supplied to delegates.

After luncheon Mr. John Wilson said he had seen Mr. Hardie, and had arranged with him that the whole of the resolution, with the exception of section A, should be take up now; and that section A should be discussed after the slips had been circulated. This was agreed to; and then it was resolved, on the motion of Mr. Wilson, "That section A, dealing as it did with the eight hours question, should be the first order of the day to-morrow morning."

Mr. Hardie then submitted his resolution, deleting section A in the meantime, and explained the proposals he advocated.

Mr. Newstead, London, seconded the motion.

Mr. Corbett, Nottingham, moved the previous question as regarded all the remaining questions embraced in Mr. Keir Hardie's resolution. This was seconded by Mr. Galbraith, Durham, and, on a division, carried by 75 votes to 49.

Trade Federation.

Mr. Juggins, Darlaston, proposed:—"That in the opinion of this Congress the time has arrived when the various trades should be drawn into closer unity, and requests the Parliamentary Committee to draw up some system of federation for the consideration of the next Congress."

Mr. Keir, Aberdeen, a blind delegate, in seconding the resolution, said that the Aberdeen Trades Council had been endeavouring, particularly last year, not only to federate the trades already organised, but to secure the union of trades that were still without organisation. In this they had succeeded to a very large extent; and he suggested that some of the Trade Unions in the south might take a leaf out of their book, though they were so far north.

The resolution was unanimously adopted.

Sewer Disinfection.—We have received an account of an experiment made by Mr. John Shaw, of Willington-on-Tyne, in deodorising and disinfecting the emanations from sewer gully-holes. It is the old idea of a basket of disinfecting material; but in place of charcoal, the basket is filled with pieces of coke saturated with paraffin. In the report of a trial made with it recently at North Shields, it is stated that the method operated satisfactorily in preventing smell where it was previously very perceptible. The cost of filling one basket is about 9d., and it is stated that it retains its efficiency for a year. We should presume that the smell of paraffin is to some extent substituted for that of sewer air, and that may be almost as disagreeable to some persons; but it will probably not be so bad for them.

Residence, Glen Ridge, N.J.—Mr. W. C. Hazlett, Architect.

RESIDENCE, GLEN RIDGE, N.J.

THIS is what is called in the States a "frame-house" of timber, with stone foundations. The interior is finished on the ground-floor with hard-wood, and the remainder with white pine. The cost was 6,500 dollars. The architect was Mr. W. C. Hazlett, of New York.

ARTIFICIAL *VERSUS* NATURAL STONE.

SIR,—It may seem a paradox to ask which is best—natural stone or artificial stone? I, however, having examined carefully into the question, find no difficulty in answering in the most positive manner that for many purposes well-made artificial stone, composed of granite, sand, and hydraulic lime, Portland cement or blue lias cement, mixed in due proportion and formed into flagstone, ashlar, steps, copings, window-sills, and, indeed, all forms for which stone is used, moulded or plain, artificial stone is beyond all compare the cheapest and best. Look at the dictionary for the word flagstone, and you will find that it means "a stone that separates in flakes or layers,—a flat stone used for paving." Then look for homogeneousness, which means a substance all of one kind throughout, which artificial stone is.

I have recently been to Croft, near Leicester, and have seen the natural granite kerbs and paving sets, and paid special attention to the artificial stone and flags, and consider that there are no better in the trade. I have also again walked over the York flagged foot pavements in the West-end of London, and can only say that in wear they are true to the name flagstone,—a stone which wears in flakes. There is not a single square yard of foot pavement of Yorkshire flags which has been six months in wear which is not showing flakes. The artificial Croft flags, on the contrary, will wear to the last, and be sound. As a trial and test for wear betwixt natural Portland stone and artificial Portland cement stone, at a bank in London, there are two doors. At one there was a natural stone, at the other an artificial stone, and this wore out three of the real stone.

September, 1889. ROBERT RAWLINSON.

CONCRETE FLOORS.

SIR,—I am disposed to believe that Mr. Ferguson may be right in his idea that "some form of gypsum, or sulphate of lime, is better adapted than Portland cement, or carbonate of lime," for concrete floors, were it not for the question of expense. I believe the cement used for Dennett's fireproof flooring is lighter, equally strong, more fireproof, and, above all, much less prone to expand and contract than Portland cement; but the prices obtained for Dennett's flooring are too high to enable it to compete with wood flooring for ordinary dwellings.

I suppose Mr. Ferguson, in advocating the employment of slabs of fibrous plaster as a permanent centering and ceiling, does not overlook the fact that these slabs would still need temporary supports; so that the cost of the fibrous plastering would be substituted for cost of use of planking only. I think the result could not fail to be more expensive than by the method of waterproof centering, which I am now using, and have recently described.

When replying to Mr. Fawcett's first letter, I was unaware that he had in the market a method of his own. But I subsequently saw his advertisement in the *Builder*, and at once felt it would ill become me, as a mere architect, to publicly discuss with Mr. Fawcett, or any other manufacturer, the merits of his own material and methods.

It appears to me (but I may be mistaken) that Mr. Fawcett's flooring must be more costly than simple slabs of concrete; because of the quantity of both iron and terra-cotta employed. At the same time, Mr. Fawcett's method may possess special advantages for special cases, where cheapness is less essential than for ordinary dwellings.

In mentioning half-a-crown a yard as the amount saved by omitting joists and one-coat ceiling, Mr. Fawcett leaves out the cost of the remaining two coats of ceiling and of the flooring boards themselves. My contention amounts to this: that the floors of the upper rooms of cottages and small houses, if of good concrete slabs, say 4 in. thick, would possess enormous excess of strength, and would cost not more than wooden floors and plaster ceilings *per ordinaire*. It is for this class of work, offering safety from fire to the common people, that I think any construction of confined iron girders, terra-cotta, and concrete inapplicable, because too expensive. The prices at which considerable contracts for concrete flooring, done under my direction, have at various times been taken (and which I am, of course, precluded from publishing in detail), justify my contention that fireproof dwellings need cost no more than non-fireproof ones.

I may perhaps be permitted to add that if we, in a discussion of this sort, do not welcome the expression of opinion from personally interested manufacturers, as well as from less personally interested architects, we may miss much practical information of real value. It is the men who actually work with a material who ought to,—and generally do,—know most about it. We are all aware "there is nothing like leather"; still, if we wish to reach a good understanding, even of leather, we must not pillory the leather-makers; and I do not suppose Mr. Potter meant, or wished, his remarks to have that effect.

As this letter is long enough, I reserve till next week my reply to Mr. Sutcliffe's thoughtful communication, which will involve a diagram or two, probably requiring time for your printer to execute. FRANK CAWS.

BACTERIA IN WATER.

SIR,—Permit me to supplement your useful articles on water supply by a few facts touching the bacteriological side of the subject.

It is generally recognised by Koch, Klein, and other investigators, that disease in the animal body is not so much caused by pathogenic micro-organisms as by the alkaloidal action of the poison ptomaines they elaborate; therefore we need, even more than destruction of the parasite, destruction of its products also. It is thus that bacterium termo and its kindred of the putrefactive group acts, and it is not correct, as quoted in the article, to say such organisms are "not capable of communicating disease to man." Further, it is well established that chemical agents do not act similarly on dissimilar organisms,—some are killed, whilst others retain their action. The destructive effect of the putrefactive microbes is often illustrated in cases of poisoning by tainted foods, and in a recent report to the Home Secretary I commnnicated the hypothesis that the late Mr. Maybrick, of Liverpool, not improbably died of such disease: certainly no one can deny that the ante and post mortem symptoms were exactly those of ptomaine poisoning. The summer diarrhœal epidemics, too, are caused by activity of cadaverous parasites obtaining lodgment in the intestinal canal, where they luxuriate especially in the milk diet of infants. This fact I prognosed long before discovery of the organisms, and met it by antiseptic treatment. Thus much for the injurious working of putrefying organisms operating under conditions favourable to growth.

True, it is too frequently the practice of young microscopists to report that a given quantity of such a water or sewage contains so many organisms without indication of their nature, thus reducing the value to zero. Every microbe or colony of organisms may be identified by painstaking investigation. This is assuredly so as regards the disease organisms, large numbers of which are now differentiated.

We realise the wondrous ways of Nature in controlling the intensity of harmful micro-organisms; one is restrained and attenuated by a dry atmosphere, another by cold, the next by a spell of hot weather. Other species die by exposure to the sun's rays; many are warred upon by other bacteria; whilst probably all genera of the pathogenics are consumed by paramecea and other groups of the higher organisms. Again, prophylactic action of the fluids of the healthy body destroys many organisms. Finally, others of a highly dangerous type are at once killed in passing into the sewer or cesspit!

To these diverse ways of disposing of a redundancy of bacterial life, man has added many varieties of so-called disinfectants, as Dr. E. Klein, F.R.S., our greatest authority, calls them; he adds, "which for the purpose are useless and deceptive, involving a waste of otherwise useful materials."

Dr. Frankland's dictum, quoted in the article, that because common bacteria are destroyed by certain agents, harmful bacilli are similarly killed, is antiquated and false, as is well known to those familiar with the subject.

Take, for instance, the carbolic acid of commerce,—which, by the way, paradoxically contains little or no carbolic acid,—one part in 400 of water at once destroys all putrefactive organisms as well as the common aërial moulds. But Von Esmarch reports that carbolic acid in the proportion of 1 : 20 does not kill anthrax spores until after twenty days' submersion. On the other hand, the innocuous Periodate, lately reported on by Dr. Klein, *instantly* kills cholera bacilli and typhoid fever bacillus when diluted 1 : 5,000, but this is not the limit of dilution.

Investigations in my laboratory, at present unpublished, show that *all* putrefactive microbes and the poisonous ptomaines they create are destroyed when Periodate is used as 1 : 250,000, although, singularly, the aërial moulds are not much affected by it,—in favourable conditions even growing more vigorously in suitable cultivation media in presence of Periodate. But these moulds are harmless, and may even be necessary to the digestive functions, as we are always swallowing and inhaling them.

Thus, it is shown to be fallacious to test the action of a supposed antiseptic or disinfectant against organisms possessing neither septic nor infective properties; still more so to infer pathogenic destructive powers to a chemical preparation because it restrains innocuous organisms; and yet this is but too frequently the course pursued by many investigators, to the mystification of the public. Let the patient student be not dismayed by the apparent anomalies of the various schools of researchers, chemical or bacteriological, whose methods and meanings may be unravelled and understood by careful study. The future will reveal to the inquiring mind, now known to the expert, practical methods of eliminating hurtful microbes from water used by the household for potable purposes, or by the mariner and traveller who draws supplies from the malarious shores of the ocean, as well as for the effective treatment of sewage for deodorisation or disinfection. RICHARD WEAVER.

PROVINCIAL NEWS.

Exeter.—On the 10th inst. the new Middle School for Girls, which has been erected by the Governors of the Exeter Episcopal Trust as a permanent home for the establishment in lieu of its present location in Queen-street, was formally opened. The Trust is an old one, having its origin in a fund started in 1709 by Bishop Blackall for educational purposes in connexion with the Church of England. Up to the present time the school has been located in the old Bankruptcy Court, in Queen-street, but this was never regarded as other than a temporary resting-place; the Governors from time to time considered various sites with a view to building, and at length they selected as a site a portion of the lands of the Trust abutting on the Pennsylvania-road, just above Hill's-court. The new school-buildings are from the designs of Mr. James Jerman, F.R.I.B.A., Exeter, and have been erected by Mr. William Gibson, also of that city. The building is Renaissance in style. The walls are of dark local brick—supplied by Messrs. Hancock—with Box stone dressings. The main entrance is of Box stone. The ground-floor is divided by a corridor extending the whole width of the building. On the front, to the south of the main entrance, there is a room for the head-mistress, and a class-room, while on the north side there are two class-rooms, each of these apartments being 24 ft. by 20 ft. On the opposite side of the corridor are cloak-rooms, offices, and a strong-room for the safe custody of deeds and papers, while in a southern wing on the ground-floor will be found the Kindergarten, 30 ft. by 18 ft., and a cloak-room. The first floor is approached by a broad stone staircase with iron railing, and it leads to a corridor similar to the one on the ground-floor. On one side of this corridor is the chief school,—a lofty room, with open-timbered roof. This room is 73 ft. by 24 ft., and at the southern end there is a dining-room, 24 ft. by 20 ft. The latter is shut off from the school by revolving shutters, so that when necessary the two rooms can be thrown into one. On the other side of this corridor, at the rear of the building, there are cloak-rooms and offices, while on the southern wing, over the Kindergarten, there is a class-room, and close by there are sitting-rooms for the assistant-mistress and student-teachers. The corridors are laid with encaustic tiles, manufactured by Messrs. Webb, of Worcester, and the floors of those on the upper story are of concrete, carried on iron cross girders. The interior walls are stuccoed and finished with calcarium. The school and class-rooms also have dados of varnished deal, and the walls are of a pale green tint. In the corridors the walls are of a French grey tint. All the rooms are provided with fireplaces, rather for appearance sake than actual use, as the building will be heated throughout by hot-water pipes supplied from boilers situated in the basement. Messrs. Wippell Bros. & Row supplied the hot-water apparatus, and Messrs. Willey & Co. the gas-fittings. The carved work on the front and in the principal room was carried out by Mr. Harry Hems.

Farnworth (*near Bolton*). — What are described as "New Salvation Army Citadel Buildings," are about to be erected for General Booth in Albert-road. The "citadel" will be of brick, and approached from Albert-road by short flights of steps, leading to four spacious entrances, two of which again lead to a large, deep gallery, octagonal in form, and extending across the front and round two-thirds of the building. The gallery intersects two tiers of boxes on each side, capable of accommodating twenty-five persons, and these, in turn, are connected with the speakers' platform and amphitheatre-stage, the latter being formed in a recess behind a proscenium wall. Separate side entrances and staircases are provided for the boxes. The other front entrances lead to a commodious foyer communicating with the auditorium and left and right wing seats. In the side walls two extra exits will be provided, which are to be opened only from the inside in case of panic. There are offices, guard-rooms, a heating-chamber, and the usual appurtenances, at the sides and behind the amphitheatre recess. For the week-night meetings the building will be so arranged that seating accommodation for 400 persons can be provided, though the full accommodation will be 1,200. Outside, the elevation to Albert-road is to be of a castellated character, finished with turrets and battlements. The work is being carried out by local builders (Messrs. Taylor Bros., of Albert-road), who have obtained the contract in open competition, under the superintendence of the architect, Mr. J. Williams Dunford, of 101, Queen Victoria-street, London, E.C., whose resident clerk of works is Mr. Streeton. The total cost of the erection will be over 2,000*l*.

The Student's Column.

WATER-SUPPLY.—XI.

RIVER POLLUTION.

RIVERS form convenient supplies for large towns, but they are liable to all sorts of contamination. From their source to the sea they collect impurities, some of which, being solid matter, are mechanically suspended by the motion of the water, so that the greater part can easily be removed by the agency of subsiding reservoirs and filtration. Water drained from hilly regions is, from having soaked through spongy peat beds, frequently of a pale-yellow colour, which tint it retains for a long time, but apart from its objectionable appearance it is perfectly good and wholesome. Other decayed vegetable matter collected in the river basin, however offensive it smells, is not a very dangerous form of pollution. The drainage from well-manured agricultural lands, together with animal excreta in general, and especially town sewage, most of which (more particularly the last-mentioned product) are purposely discharged into streams, form elements seriously calculated to prejudice the quality of river water; therefore it may be well for us to consider the effects of these organic substances on a large scale. As explained in a previous article, animal excreta are exceedingly unstable in their chemical constitution, becoming rapidly resolved into harmless compounds in the presence of oxygen. On being discharged into a river, this animal refuse finds the required oxygen, especially if the water is much agitated through being shallow, and having a rocky bottom, or by its passing over weirs. Portions of the noxious matter are abstracted from the water by fish and other animal life, whilst the growth of aquatic vegetation further assists in absorbing it. The free oxygen, however, has the most salutary effect. Many cases are on record where sewage has been emptied into a running stream, but it was impossible to detect this fact on examining the water a few miles lower down from the point of the discharge, so rapidly and effectively had Nature worked its purification. From this, it may be gathered that river water, even after being strongly impregnated by the worst forms of animal contamination, is rapidly purified by the processes of Nature. Of course there is a limit to the purifying action on such pollution, the river could not deal with an unlimited quantity; and from the disgusting nature of town drainage, and even out of respect to the opinions of those learned chemists who believe in the "previous sewage contamination" theory, it is highly advisable not to import more of the objectionable substance into rivers than can possibly be helped. In the presence of our advanced knowledge respecting the treatment of sewage, there is no excuse for local authorities to dispose of town drainage by discharging it into the nearest waterway. We may mention, however, that where sewage is destroyed by chemical precipitation, although a great deal of good is done by removing the suspended solids, the remaining fluid is still obnoxious. Where the sewage is applied to the land by irrigation or filtration, the case is different; nearly all authorities agree that when this is properly carried out, the quality of the water as subsequently resulting from percolation, &c., is practically unaffected.

Rivers running through mining or manufacturing districts being so often the receptacles of all kinds of refuse, both liquid and solid, are frequently fouled to such a high degree as to be of no use for water supply purposes. In designing a scheme, it is essentially necessary to obtain some information respecting the nature of the manufactories in the catchment area or gathering ground.

HARDNESS OF WATER.

From the disintegration of rocks, both at the surface of the ground and at some depth, water derives much mineral matter, which more or less affects its quality. These mineral substances are chemically dissolved therein, and are sometimes present in such great quantity as to render the water unfit for ordinary drinking purposes, but are, nevertheless, useful medicinally. In dealing with mineral matter in solution in ordinary water, derived either from springs or rivers, we have practically only to consider the salts of lime. Rain water contains a due proportion of carbonic acid, which it derives from the air, and any rock containing much carbonate of lime, such, for example, as chalk or oolitic freestone, is readily attacked by this acid. Carbonate of lime is only very slightly soluble in water; but the carbonic acid converts the lime into a bi-carbonate, which is quite soluble and runs off with the water into the nearest rivulet, or else soaks into the ground to issue forth eventually as springs, or to be found in wells. It may happen that the lime is also in part derived by the same action in percolating calcareous rocks during its sojourn underground. The addition of these lime salts imparts the quality known as *hardness;* and a water is said to be hard, moderately hard, or soft, according to the proportion of lime found in it. It is questionable whether it is better to use hard or soft water for large town supplies, as authorities lean either way. Large cities have sometimes gone a long distance to obtain hard water, although soft was much more easily procurable, and *vice versâ*. The fact is that each kind has its peculiar uses.

Most persons living in the east and south-eastern portions of England would at once admit, because they are used to it, that hard water is much more palatable than soft, being sparkling and crisp to the taste; but the inhabitants of the western portion, and in general where soft water is used, deny this; so that really it is a matter of taste. Attempts have been made to prove that the physique of the population, and the general health, are not so good in towns where soft water is used, but these have signally failed; for whatever diseases can be traced to it are more than counterbalanced by the calculous diseases which, in the opinion of high authorities, are caused by hard water. At the same time, there can be no question that soft water has the power of absorbing a greater quantity of organic impurity and gases than hard water, whilst the latter keeps better in large quantities. Lead and iron are much more readily attacked by soft water, and its action on the former metal has sometimes led to poisoning from this cause. The action takes place more particularly on the clean, bright metal when new, than when it is subsequently encrusted by a dusky film. For manufacturing purposes, soft water is unquestionably the better. The lime in hard water causes much more scale inside boilers, and the choking of hot-water pipes is often due to the deposition of that mineral within them. The reason of this is well known. When water is boiled, the carbonic acid in it is rapidly driven off, and the lime, having in consequence lost its support, is deposited, in the manner indicated, on the sides of the vessel, or other contrivance holding it. Boiling, however, will not remove all the hardness, only the carbonate being taken away, certain other salts of lime still remaining, as a rule. Water is said to be either of *temporary* or *permanent* hardness, the former being its appellation before being boiled, and the latter afterwards.

Soft water is better for domestic purposes,—cooking, &c. It is immeasurably superior, also, for washing, as it makes a good lather, whilst hard water is more inclined to curdle or decompose soap by combining an alkali with the lime. The *degree of hardness* is arrived at in proportion

to the power of water to decompose soap of a certain composition. All these points have been thoroughly threshed out by engineers and chemists, and have had a large share in influencing the selection of many sources of supply drawn upon at present for the use of some of our largest communities. At first, it might seem somewhat trivial to make much of the superior advantage of soft water for washing purposes, but when we reflect on the matter we find that, on the contrary, it is well worth consideration. The supply of Glasgow from Loch Katrine (the extension work of which is still progressing), may be instanced as an example of the comparative advantages of the one kind over the other, in regard to this point. The water of the lake is much softer than that of the Clyde, from which the city formerly obtained its supply, and although it has cost an enormous sum of money to make this change, it has been shown that the rate charged upon the inhabitants for the better supply was practically paid by the saving effected in soap, dye-drugs, and certain other chemicals, but especially the first-mentioned article. Manchester has been cited as another case in point; whilst the late Mr. Bateman was of opinion that notwithstanding the enormous initial cost of the enterprise, London could be supplied with soft water, by his scheme, from the mountainous districts of North and Central Wales, and that the expense would be more than defrayed in the end, owing to the saving in so many ways, but especially in regard to soap. We shall refer again to this matter when speaking of water-supply to the metropolis.

Hard water may be made softer in many ways. We have shown that this can be done by boiling the fluid. This, of course, is not practicable on a large scale. Clark's process is well-known. It consists, principally, in adding lime-water to the hard water; the free carbonic acid in the latter combines with the lime in the former, forming a carbonate, which together with the carbonate already in the hard water are thrown down, thus eliminating its chief hardening properties. This process is perfectly successful, either on a large or small scale, but, as it is said to add so much to the cost of the supply, it has not been generally adopted. Within recent years modifications known as the Porter-Clark and the Atkins processes have received much attention. In these the precipitation of the lime is much facilitated, and the whole method of softening is much more expeditiously carried out, and in a more convenient manner than by the older method. It would not be difficult to mention other inventions having the same object, such as the application of spongy iron, filters, &c. Suffice it to say that if soft water is absolutely necessary or more convenient for any manufacture in a town which is already supplied with hard, it can easily be produced.

Calcareous water is also softened naturally by exposure to the air, when its carbonic acid disappears, and lime precipitation is the result.

Books.

Iron and Steel Manufacture. By ARTHUR H. HIORNS, Principal of the School of Metallurgy, Birmingham and Midland Institute. London: Macmillan & Co.

THIS handy little book, consisting of fifteen chapters, is well worth perusal by engineers, as it deals in a very able manner with the fundamental principles of the various processes employed in the manufacture of iron and steel, and gives a practical account of both the chemical and mechanical properties of these metals. The present time, as the author reminds us, is "an age of steel," and, this being so, we welcome any book which describes, in good language and practical form, the latest that is known upon the relative advantages of iron and steel; although there are some manufacturers who, having invested capital upon extensive machinery and plant, may be indifferent to such a publication. Sir Joseph Whitworth proposed to designate iron and steel, as employed in works of construction, by its tensile strength in tons per square inch of section, coupled with a record of the amount of elongation attained prior to fracture with a use of a standard test-piece. This plan has been followed by practitioners in different specifications, and occasionally, in addition, the amount of contraction of area at the fracture is also specified. The chemical combinations and the mechanical treatment being left to the manufacturer, the designer of any constructive work remains satisfied if the specified results of strength upon test-pieces of a given size are obtained. So long as iron alone had to be considered, this might suffice; but in these days, the practitioner ought to know more, and to be able to state why he employs wrought-iron, cast-iron, or steel in any given situation. The author's specified tests are very good for each of these three classes of material, and his definition of the most general metallurgical terms should be read by all those who were interested in the articles on "Iron" which appeared in our "Student's Column" last year. The author modestly states in his preface that "the book is not intended to supersede any of the larger manuals on the subject, but rather to prepare the student for a more advanced course of study." The first chapter is interesting for its historical matter, and the succeeding chapters each conclude with a set of from nine to twenty-three useful questions, intended to test the proficiency of the reader when studying the pages. The book is sufficiently illustrated as an elementary text-book, and concludes with a concise and well-arranged index.

The Law relating to Tenement Houses and Flats for Residential and Business Purposes: including Taxation and Rating thereof, with an Appendix of Forms and a Digest of Cases relating to the Inhabited House Duty. By WALTER CLODE, Barrister-at-Law. London: W. Clowes & Sons, Limited. 1889.

THE increase in the number of residential buildings, known popularly as "flats," makes the present time opportune for the publication of a legal work on this subject. At the same time, it is as well to remember that, for business purposes, "flats" have long been in existence, and the law is the same in the one case as in the other. But that a work dealing with the entire body of law on this subject, and written in a sufficiently popular style to be intelligible to laymen, was required there can be no doubt. Mr. Clode's book seems to fulfil all the necessary requirements, though it might have with advantage been more concise. There is a too great parade of learning observable in it, and American cases are frequently cited which do not seem to be very much to the point. For example, the writer lays down the following proposition as regards the duties of the porter: "The rule seems to be that while engaged upon his general duties he is the landlord's servant, so as to make him liable; while engaged upon any special duties for a tenant he is that tenant's servant, so as to make him liable" (p. 50). This statement is correct: the illustrations are an American case about leaving open a tap, which appears to turn rather on a question of improper construction, and one as to the management of the lift, which again is somewhat vague. Apart from these blemishes, the book is well done; the contents are carefully separated into chapters dealing with such subjects as the staircase, hall, passage ways, and lift, which are the subject of Chapter VIII. Of considerable practical value are the chapters on the Inhabited House Duty and on Rating. We have done no more here than indicate the character of the book; it would be of little use to pick out passages for citation, since any one who may be concerned with the subject will now be in a position to refer to this work for the elucidation of such difficulties as may present themselves.

Blackie's Modern Encyclopædia of Universal Information. Vols. I. and II. With numerous pictorial illustrations and a series of maps. Edited by CHARLES ANNANDALE, M.A., L.L.D. London: Blackie & Son. 1889.

THE first two volumes of this encyclopædia are now complete, carrying it down to near the close of letter C; and if it is carried through steadily and without inordinate delay, we may congratulate the publishers and editor on having produced one of the best popular encyclopædias on a comparatively small scale which has been brought before the public. The range of subjects treated is exceedingly large, and though of course no subject of importance can be at all fully treated in an encyclopædia on this moderate scale, the book seems to furnish what is required from a popular encyclopædia—a concise and intelligible statement of the meaning of each word that is inserted, or the outline of each subject that is treated. So large a subject as Architecture can of course only be gone into in the most general way in a work of this kind, but under the article "Architecture" a praiseworthy attempt has been made to give an intelligible sketch of the central history of architecture in the course of about four pages, and the article is at all events quite correct as far as it goes. The author, if limited to this space, should, however, have endeavoured to give a general idea of what architecture means (he does commence with that), with examples of its typical forms of construction and design drawn from the most important styles; *i.e.*, he should have treated of architecture in the abstract, rather than have attempted to deal with architectural history, which is too large a subject for such a work, and only two or three links in the chain are arbitrarily selected for illustration; the method is wrong, though the execution of the article, granting that method, is good. In some other classes of subjects, not strictly coming within the scope of our criticism, we have observed also a very good treatment of the subject, giving the main facts in a concise manner. The pictorial illustrations are not very much; most of them look like old cuts; but the maps appended are very good, and form a valuable addition to the book. The encyclopædia is admirably printed, in clear double-column pages, and the binding is effective and in good taste. The volumes are in small quarto form, convenient for the hand. Mr. Annandale, the editor, has already done a piece of excellent work for the general public in his one-volume dictionary of the English language, probably one of the best small dictionaries of the kind that has been produced: and his undoubted success in that work promises well for the encyclopædia, which so far appears an exceedingly satisfactory and useful publication.

Our English Villages: their Story and Antiquities. By P. H. DITCHFIELD, M.A., F.R.H.S. London: Methuen & Co. 1889.

THIS is not a history of any special villages, but a small book giving a suggestive sketch of the various kinds of objects of interest, especially in the way of antiquities, which may be looked for in and about the neighbourhood of old English villages. The book originally appeared in the form of essays in Canon Erskine Clarke's *Parish Magazine*, and is addressed to the class of readers who form the bulk of the population in most country parishes, with the object of setting them thinking a little about the history and associations of the place they live in, instead of about "mostly naught," like the rural labourer in *Punch*. The author in his opening chapter runs over some of the objects of interest which may be found in connexion with many a country village. The manor-house perhaps stands on the site of a much older house, carrying us back to Norman times and the feudal system; the names of the fields may have a good deal of historical meaning; and what is that curious formation on a neighbouring hill, which looks like an earthwork? "we will presently examine that more closely, and find out by whom it was constructed." The Magpie Inn, which is much too large for its business now, was a stirring place before the railway, when it was a regular coaching inn; the reader is invited to try and realise what the change has been. There may be gravel-pits near the village in which old flint implements will possibly be found. These possible subjects of interest are expounded more in detail, and the reader gets hints how and where to look for them.

The author is a little too much of a *laudator temporis acti* now and then, as those who busy themselves about things of the past generally come to be. He speaks of the want of village games and sports now, "except when some energetic rector or curate starts a cricket club. . . . The village green, the source of so much innocent happiness, is no more; and a recent writer has observed that the ordinary existence of agricultural labourers is so dull, that in East Anglia they have almost forgotten how to laugh." There may be a sad truth in this last sentence; but if the writer could go back to the village-green sports of former days he might be astonished to find how boorish they were in reality, though Maypole dances look so well in pictures.

However, Mr. Ditchfield may be congratulated on having done something towards a chance of increasing the interest and lessening the dullness of life in country villages. His little book is admirably suited for those to whom it is addressed, and we recommend to

the notice of country clergymen who are desirous of any assistance in opening the minds and extending the interests of their humbler parishioners.

A List of Parish Churches retaining Special Mediæval Features—Glass Vestments, Plate, &c. Compiled by HENRY LITTLEHALES, London: Rivington. 1889.

IN this little book Mr. Littlehales has done a most useful piece of work. It is not claimed that it is exhaustive, and it is probably far from being so; but it gives, under the heading of counties, a large list of churches in which various mediæval relics exist, with a brief note of the nature of the relic in each case, which cannot fail to be a great assistance to those who are on the look out for such relics, or who do not wish to pass over any that may come in their way.

The author notes in his preface that he will be glad of any corrections or additions.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

12,729, Metallic Roofing. G. H. O. Bolken (Stuttgart).

The improvements which are the subject of this patent consist in the use of spring clamps, which allow the sheets to be removed from the roof and packed for transit. On one side of each sheet is a rebate fitting into a corresponding rebate on the other side of sheet. The covering of the roof is managed as follows:—The sheets in the first row are secured to battens so that the rebate of one sheet laps over the contiguous rebate of the next sheet. The sheets in the second row are similarly laid, but so as to break joint with those of the first row. Spring clamps are fitted upon the battens, and the heads of the rivets caused to engage with the slots therein. In this manner a perfectly firm covering for the roof is maintained.

13,158, Heating Buildings. J. Lawson.

According to this invention, air and water are both heated by a furnace on the ground, and conveyed by suitable pipes to a chamber placed over the heads of an audience, and thus the air of the chamber is made comfortably warm without draught.

14,734, Air-Inlet Ventilator. B. Russell.

The front flap or cover of the ventilator which is the subject of this patent, instead of being vertical, as in the old make of Sheringham ventilators, is recessed back at the bottom so as to fall open by its own weight when the regulating cord is released. It can be made to open right or left hand, and is hung at any convenient point removed from its centre.

16687, Improvements in Sash-fasteners. J. Burn.

The sash-fastener which is the subject of this patent is made very much in the form of those in general use, but it is claimed that in the manufacture and arrangement of parts great economy is effected by the shape and position.

10,902, Chimneys, &c. J. B. Tonge.

This is a modification of previous patents, 7,957-88 and 12,748-88. Instead of using movable flaps for the interception of down draughts, curved louvres or passage-ways are used. These prevent rain coming in, and yet effectively exhaust the air, or provide efficient ventilation.

11,117, Extracting Cowl or Ventilator. J. D. Fryer.

According to this invention, a revolving cowl is used, the spindle of which is placed in a hollow tube or socket, the top of which is widened out, so that a number of hardened metal balls surround the spindle at this point. The top of the revolving cowl terminates in screw-shaped pieces of metal, forming openings where each piece of metal is turned up into the air. One of these screw pieces is hinged, so that the bearings of the revolving cowl may be oiled with ease, and an ornamental knob may be used as a finish to the cowl.

NEW APPLICATIONS FOR PATENTS.

Aug. 26.—13,410, E. Thomas, Ventilators and Chimney-cowls.—13,422, T. Downie, Treads of Steps or Stairs, &c.—13,449, H. Lake, Saws.

Aug. 27.—13,483, R. Peel, Top Bars for Fire-grates.

Aug. 28.—13,579, R. Wilford, Automatic Fastenings for Windows with Sliding Sashes.—13,581, J. Rodda, Water-waste Detector.—13,589, A. Fitton, Spring Cupboard-door and Casement-fastener.

Aug. 29.—13,618, J. Lede, Ventilator.—13,625, T. Brindley, Lifting-catches, &c.—13,642, F. Cowley, Self-locking Window-fastener.—13,649, J. Weiss, Fastening for Handles of Tools.

Aug. 30.—13,671, T. Fawcett, Brick-making and Pressing Machine.

Aug. 31.—13,749, H. Aitken, Treatment of Timber.—13,764, J. Tall, Sash-frames, Sashes, &c.—13,765, J. Tall, Doors, Shutters, &c.—13,767, F. Lane, Horizontal Sawing Machinery.

PROVISIONAL SPECIFICATIONS ACCEPTED.

9,915, F. Wells, Combined Supply, Overflow, and Waste Fittings for Basins, Baths, &c.—10,333, A. Thornalley Hoffmann, Brick Kiln.—10,694, A. Curtis and A. Yeates, Cowl or Ventilator.—11,494, W. Bodin, Flushing Cisterns. — 11,645, R. Scott, Cisterns for Flushing Water-closets.—11,792, A. Bates, Traps or Gullies.—11,959, J. Stenner and Others, Chimney Cowl and Ventilator.—12,213, J. Haskins, Wooden Revolving Shutters.—12,232, E. Olander, Floor-plates and Floors for Bridges, Buildings, &c. — 12,397, H. Owens, Opening, Closing, and Securing Casements, &c.—12,665, R. Haddan, Water-proof Material for Walls, &c.—12,672, S. Chandler, Chimney-top.—12,730, T. Hancock, Closing and Securing Gates and Doors.—12,867, H. Whiteley, Draught and Dust Excluders for Doors.—13,098, W. Edwards, Fastening or Fixing Ironwork to Stonework or Woodwork.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

13,167, W. Jago, Bakers' Ovens.—14,941, A. Gauge, Electrical Burglar Alarms. — 15,510, J. Turner, Combination Door-chain and Bolt or Bar.—15,613, T. Penario, Water-waste Preventing Cisterns.—2,061, E. Edwards, Holding open Windows in any desired position.—8,620, R. Cousins, Girder, &c.—10,498, E. Wright, Locks or Door Fastenings.—10,518, C. Hobbs, Distemper or Whitewash Brushes.—10,979, H. Munday and H. Walker, Gate Fittings.—11,658, G. Bastucchi, Plastering Walls and Ceilings.

RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

SEPT. 4.—By FULLER, HORSEY, SONS, & CASSELL.

Purfleet, Essex—The St. Louis Park Mills, area about 10 acres, f.	15,000

By CHARLES & TUBBS.

High Barnet—1 to 12, Underhill Cottages, f., r. £168 p.a.	1,150
City—74 and 75, Fore-street, u.t. 78 yrs., g.r. £254. 14s., r. £452. 12s. p.a.	1,000

By FAREBROTHER, ELLIS, CLARK, & CO.

Camberwell—245, 247, and 249, Camberwell-road, f.	2,100

By A. G. OLLEY.

Wimbledon—34, Pelham-rd., f., r. £38 p.a.	550

SEPT. 5.—By J. J. BETHELL.

Plumstead—67, Llanover-rd., f., r. £25 p.a.	260
Upton Park, Jephson-rd.—A plot of land, f.	40

By WYATT & SON (at Chichester).

Sussex, East Pollant—F. residence and stabling	1,500
Singleton—Four c. cottages, r. £28. 17s. p.a.	555
Hunston—Two f. cottages, r. £10. 8s. p.a.	190

SEPT. 6.—By HARDS & BRADLY.

Belgravia—62 and 64, Ebury-st., u.t. 33 yrs., g.r. £18, r. £145 p.a.	2,030
Newington Causeway—26, Union-rd., u.t. 14 yrs., g.r. £1. 4s., r. £33 p.a.	160

[*Contractions used in this list.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

The Bank of Ireland, Dublin. — The *Daily Express* says that in a short space of time a very marked improvement will be effected in the exterior of the Bank of Ireland, which has of late presented a very dilapidated appearance when compared with the renovated National Bank opposite, and the new building of the Munster and Leinster Bank, next door to the National Bank. For some time past, however, a hoarding has been erected outside the railings of the Bank of Ireland, and a number of men, in the employ of Messrs. Kennan & Sons, have been engaged in taking away the old railings, which have occupied their position for many years. The new railings are designed by Messrs. Millar & Syms, architects. The whole work is of Irish design and of Irish manufacture, the stone for the foundation having been obtained from the well-known quarries of Ballyknocken. The new railings will not be carried around the building at present.

The English Iron Trade.—The English iron market is still active, and its tendency is once more decidedly upwards. Business in pig-iron continues on the old lines; quiet, but steady, in some districts, but unmistakably animated in Scotland and the north-west of England. Scotch makers' iron is very scarce, owing to a large local consumption, and producers are constantly raising their prices. Bessemer iron in the north-west has gone up 2s. 6d. a ton during the week. Elsewhere quotations are fairly well maintained. Trade in manufactured iron is increasing, and rates are from 2s. 6d. to 7s. 6d. a ton higher. The demand for steel is very heavy, the consequence being that ship-plates have been advanced 2s. 6d. a ton, rails from 2s. 6d. to 5s., billets 5s., and blooms 2s. 6d. Shipbuilders remain very busy, and engineers keep well employed.—*Iron.*

Miscellanea.

A Proposed London Dock and Wharf Trust.—At the weekly meeting of the Balloon Society, held at St. James's Hall, on the 6th inst., a lecture was delivered by Mr. W. H. Lefevre, C.E., the president of the society, on "A London Dock and Wharf Trust." Mr. Merritt occupied the chair. After a brief opening address by the chairman, the lecturer observed that the protracted strike of the dock labourers marked a new era in the struggle between capital and labour. The real origin of it was the insane cut-throat competition between the dock companies and the wharfingers, intensified by the keen contest between shipowners and merchants, and the superabundant dock accommodation now in existence. One important aspect of the strike was the position of the shareholders in the dock companies, many of whom were widows and orphans of very limited means. There were about 1,500 shareholders in the East and West India Dock Company, and some 3,000 in the London and St. Katharine Dock Company, who were in the unenviable position of receiving no dividend and exercising no control over their property. Attention had been called to the growing tendency of the trade of the port of London to pass further and further down the river, in order to accommodate the ever increasing draught and length of the immense vessels now becoming so common, and it was therefore clear that what London wanted was deeper water. That might be obtained by inaugurating a thorough system of dredging from London-bridge to Gravesend, similar to what had already taken place on the Tyne and the Clyde, aided by an enbankment on both sides of the river, so as to cause the tide to ebb and flow quicker. With regard to what a Harbour Trust could do, the reply was that in some ports it had done everything, as was instanced in the case of the Tyne, the Clyde, and some other rivers. It was evident in existing circumstances that something must be done if England were to continue to be the depôt of the world's commerce, with London for its centre. The control of the Thames Conservancy might be confined to the river above the bridges, and a London Dock and Wharf Trust might be formed for the port of London, to which the London County Council should contribute one moiety for deepening the River Thames from London-bridge down to the sea. It was not an impossible thing to accomplish to take the docks of London at what they cost, and consolidate them all into one trust. Until quite lately the dividends paid by the dock companies of London upon the total capital invested worked out at about the same rate per cent. per annum as the interest paid by the Mersey Docks and Harbour Board on its total debt. Mr. Martin Wood moved the following resolution:—"That the vast shipping interests of the port of London urgently demand the establishment of a Dock and Wharf Trust, to be controlled by responsible commissioners duly elected." This was seconded by Mr. White, F.S.A., and, after some discussion, was carried by a large majority, as was also a second resolution calling upon the Corporation of London and the London County Council to promote a Bill in the next session of Parliament for the formation of a London Dock and Wharf Trust, similar to those in existence in the Clyde, Mersey, and Tyne.

Edinburgh International Electrical and General Exhibition. — A meeting of the Edinburgh International Exhibition Council was held on the 4th inst., at the offices, 40, Frederick-street, Sir Thomas Clark presiding. The final classification of exhibits was agreed upon. There will be three great divisions. The first is to comprise electrical engineering and inventions, and is to contain six sections dealing with the production of electricity, electrical conductors, electrical measurement, application of electricity, bibliography and electrical history. The second division will be devoted to general inventions and industries, and will contain twenty-two sections. These will comprise exhibits in mining and metallurgy,—gold-mining and the production of the precious metal, rural industries, architecture, hygiene, decorative art, &c., music, clothing, and accessories, foods and drinks, education and liberal arts, engineering and machinery, navigation, chemical and allied industries, women's industries, and artisans' industries. The third division is to be devoted to the fine arts.

The Forthcoming Art Congress in Edinburgh.—A meeting of the General Committee of the National Association for the Advancement of Art was held in the Council Chamber, Edinburgh, on the 4th inst., Mr. J. M. M'Candlish, W.S., presiding. A letter was read from the Marquis of Lorne accepting the office of President of the Association for the year, and agreeing to deliver the inaugural address. Professor Flint also wrote complying with the request of the Association to preach the special sermon in St. Giles' Cathedral. Professor Baldwin Brown was appointed Editor of the Transactions. It was intimated that subscriptions to the guarantee fund, including the sum of 105*l.* from the Edinburgh Town Council, amounted to £497. 12s. Donations to the funds intimated or paid amounted to 45*l.* 3s. 6d. The titles of several of the papers proposed to be read in the various sections were announced. Among them were the following:—By Mr. Hole, R.S.A., "Responsibility of the Public in the Development of the Arts"; by Mr. W. D. M'Kay, R.S.A., on "Old *versus* Modern Methods of Painting"; by Mr. A. Roche, Glasgow, on "Finish in Art"; by Mr. J. L. Wingate, R.S.A., on "Drawing as a Language for the People"; in the Sculpture Section, by Mr. Onslow Ford, A.R.A., president of the section; Mr. George Simonds, hon. secretary; Mr. Alfred Gilbert, A.R.A.; Mr. G. A. Lawson, Mr. E. Roscoe Mullins, Mr. J. Stirling Lee, Mr. D. W. Stevenson, R.S.A.; Mr. Birnie Rhind, and Mr. Geo. Webster. In the Architectural Section, papers are proposed on "The Art Education of the Public, including in Schools"; "Landscape Gardening"; "Characteristics of Scottish National Architecture and its Evolution"; "Land Tenure," &c. In the Applied Art Section, a paper on "Art in Elementary Schools" is to be read by Miss Burton; another subject in the same section is "Home Industries in Donegal," and among the contributors are Mr. W. Morris, Mr. Walter Crane, Mr. Newburgh, Glasgow; Mr. Scott Morton, Mr. Thomas Bonar, and Mr. W. S. Black.

Loss of Light through Windows.—According to our contemporary *Iron*, some interesting experiments have been undertaken by Herr Herzberg, with the co-operation of Herr G. Schulze, chief engineer of the Berlin works of Messrs. Frederick Siemens & Co., for the purpose of ascertaining the loss of light in passing through window-glass of various kinds in general use. The experiments were conducted with a Bunsen photometer, in which two Argand gas-burners of equal illuminating power were placed at the two ends of the graduated bar. After equality of illumination of the screen had been established, a plate of the glass to be tested was interposed between one of the end lights and the screen, and the extent of the displacement of the latter thus necessitated for the re-establishment of equality of illumination on both sides gave the measure of the opacity of the glass. A simple translucent but not transparent glass showed a loss of 27 per cent. of light. Cathedral glass, such as is used in stained-glass work as a basis being clear, but with a slight ground tint, showed a loss of 12¾ per cent. Plain cathedral glass with a white tint also showed a loss of 12¾ per cent. Plain white Rhenish "double glass" gave a loss of 10 per cent. Plain thin mirror glass obstructed 10 per cent. of light. The two last together, with an interval of 6 centimètres between them, showed a loss of 21 per cent. Cathedral and Rhenish "double glass" together, with the same interval, showed a loss of 23 per cent. A ground glass with cut stars together with a white background, such as is found in house fanlights, obstructed 60 per cent. of light. A new clean piece of ground glass without stars, together with the dusty white glass background as in the preceding experiment, showed a loss of 40 per cent.

The Engineering Chair in the Heriot-Watt College, Edinburgh.—At a meeting of the Heriot-Watt College Committee, on Monday last, it was agreed that the names of Mr. William E. Dalby, London and North-Western Railway Works, Crewe, and Mr. Richard Stanfield, Royal Mint Laboratory, London, should compose the short leet to be submitted to the Heriot-Watt Governors for the vacant Chair of Engineering and Mechanics, caused by the appointment of Professor Beare to the Professorship of Engineering and Mechanical Technology in University College, London. The Governors met on Tuesday, when the appointment was made, Mr. Stanfield being elected by eight votes against seven recorded for Mr. Dalby.

Opening of the Bryden Memorial Hall, Saltcoats.—The memorial hall erected in connexion with the Mission Coast Home as a tribute to the memory of Mr. William Bryden and those associated with him in the founding of the Home—Mr. James Smith and Mr. Thomas Corbell—was formally opened on the 5th inst. A striking feature of the new buildings is an octagon tower about 65 ft. high beside the entrance, on which are carved in panels the monograms of the founders of the Home. The entrance is through a massive arched doorway, resting on granite columns. On the ground-floor, to the right of the entrance, there is a recreation-room, 23 ft. long by 15 ft. broad, for the use of women. The hall is comfortably furnished and well lighted by three high windows, two of which look on the street, while the other has a sea view. On the other side of the building are a number of dormitories, each about 9 ft. square, plainly but comfortably furnished. A substantial stone staircase in the tower leads to dormitories above similar to those on the ground-floor. The whole of them are heated with hot-water pipes, and there are lavatories on each flat. It is intended that the dormitories in the new buildings are to be occupied by women. The Memorial Hall faces the sea, and connects with the front building by an inner hall, lighted from the roof with a fine tinted lantern window. The hall is 33 ft. long and 17 ft. broad, with a lofty ceiling 18 ft. high. It is to be used as a reading and recreation-room for male patients. There are five large windows, from three of which a magnificent view can be had of the Ayrshire coast and the Firth of Clyde. The cost, including furnishings, will be 1,900*l.* The architects were Messrs. H. & D. Barclay, Glasgow.

The Paris Exhibition.—It is stated that it has been finally determined to close the Paris Exhibition on October 31. Whilst speaking of the Exhibition, we may mention that on Tuesday evening last, at the Royal Victoria Hall, Waterloo-road, Professor Malden, formerly of the Polytechnic Institution, delivered, for the first time anywhere, his new lecture on Paris and its Exhibition. It was illustrated by about 130 large views thrown on the screen by the lantern. Most of these views were exceedingly good, and several of them were from instantaneous photographs, showing the streets of Paris, and parts of the Exhibition and grounds, thronged with people. A fairly large proportion of the views were devoted to showing the architectural aspects of Paris and the Exhibition, and the "History of the Human Habitation" series was freely sampled. Mr. Malden's remarks were, as a rule, pertinent and suggestive, although, like most other people, he overdid his encomiums of the Eiffel Tower,—which, by the way, was shown by several views, some to a large scale, clearly exhibiting the construction. The lecture is, it was announced, to be repeated on Monday, Tuesday, and Wednesday next at the same place, and workmen and others in London who cannot spare the time or the outlay necessary for a trip to Paris may be glad to see something of the Exhibition through the medium of the lantern and screen.

A Proposed New Watering-place in North Devon.—Arrangements are in progress for the creation of a new watering-place on the North Devon coast, near Bideford. It is to be called "Saunton Sands." The water supply is described as abundant in quantity and irreproachable in quality, the situation is said by a local paper to be "lovely in the extreme," and the place is stated to possess climatic advantages far superior to most of the popular health resorts in the Kingdom. "It has a direct south aspect, is completely sheltered from the north and easterly winds, and combines the temperature of Torquay with a magnificently bracing air, has seascapes and land views such as are unequalled probably in the south-west of England." There is a fine stretch of sand four miles in length available as a bathing-place. The idea of this new venture originated with Mr. J. Arthur Wallington, of Basingstoke, the manager and surveyor of numerous landed estates. Saunton Sands is to be, if not a copy of Birchington, in Kent, built in much the same fashion,—that is to say, the dwelling houses will be constructed on the bungalow principle, and in the majority of cases will be detached, and stand in their own grounds. Building operations are about to commence, Mr. Dart, builder, of Crediton, having taken the contract for erecting the inevitable hotel.

PRICES CURRENT OF MATERIALS.

TIMBER.	£.	s.	d.	£.	s.	d.
Greenheart, B.G. ....ton	7	0	0	7	15	0
Teak, E.I.....load	12	0	0	14	0	0
Sequoia, U.S.....foot cube	0	2	3	0	3	0
Ash, Canada.....load	3	10	0	5	0	0
Birch ,, ...	3	10	0	6	0	0
Elm ,, ...	4	0	0	5	0	0
Fir, Dantsic, &c.	2	0	0	3	10	0
Oak ,, ...	2	10	0	4	10	0
Canada	5	10	0	7	10	0
Pine, Canada red	3	0	0	4	0	0
,, yellow	3	10	0	5	5	0
Lath, Dantsic.....fathom	4	10	0	5	10	0
St. Petersburg.....	5	0	0	6	10	0
Wainscot, Riga, &c.....log	2	15	0	4	5	0
Deals, Finland, 2nd and 1st...std.100	9	0	0	11	0	0
,, ,, 4th and 3rd.....	7	0	0	8	15	0
Riga	7	0	0	9	0	0
St. Petersburg, 1st yellow	11	0	0	15	0	0
,, 2nd ,, ...	10	0	0	11	0	0
,, white	7	0	0	10	0	0
Swedish	8	0	0	16	0	0
White Sea	9	0	0	17	0	0
Canada, Pine, 1st	16	0	0	26	0	0
,, ,, 2nd	11	0	0	17	10	0
,, ,, 3rd, &c.	8	0	0	10	10	0
,, Spruce, 1st	9	0	0	11	0	0
,, ,, 3rd and 2nd	7	0	0	9	0	0
New Brunswick, &c.	6	10	0	8	10	0
Battens, all kinds	6	0	0	18	0	0
Flooring Boards, sq., 1 in., prepared, First	0	11	0	0	14	0
Second	0	8	0	0	10	6
Other qualities	0	5	6	0	7	9
Cedar, Cuba.....foot	0	0	4½	0	0	5
Honduras, &c.....	0	0	4½	0	0	4½
Mahogany, Cuba	0	0	4½	0	0	6½
St. Domingo, cargo average	0	0	4½	0	0	6½
Mexican ,, ...	0	0	4½	0	0	5½
Tobasco ,, ...	0	0	5½	0	0	6½
Honduras ,, ...	0	0	5½	0	0	6½
Box, Turkey .....ton	4	0	0	13	0	0
Rose, Rio.....	15	0	0	20	0	0
Bahia	14	0	0	18	0	0
Satin, St. Domingo .....foot	0	0	6	0	1	0
Porto Rico	0	0	9	0	1	3
Walnut, Italian	0	0	4½	0	0	6½
METALS.						
IRON—						
Pig, in Scotland ..... ton	0	0	0	0	0	0
Bar, Welsh, in London.....	6	0	0	6	5	0
,, ,, at works in Wales ...	5	10	0	6	0	0
,, Staffordshire, in London ...	7	0	0	7	10	0
COPPER—						
British, cake and ingot..... ton	47	10	0	0	0	0
Best selected	48	10	0	0	0	0
Sheets, strong	56	0	0	0	0	0
Chili, bars	42	15	0	0	0	0
YELLOW METAL.....lb.	0	0	5	0	0	5½
LEAD—						
Pig, Spanish.....ton	12	12	6	12	13	9
English, com. brands	12	17	6	0	0	0
Sheet, English	14	0	0	0	0	0
TIN—						
Banca .....ton	93	0	0	0	0	0
Billiton.....	92	0	0	0	0	0
Straits	91	0	0	0	0	0
Australian	91	0	0	0	0	0
English Ingots.....	95	0	0	0	0	0
Bars	98	0	0	0	0	0
Refined.....	97	0	0	0	0	0
ZINC—English sheet .....ton	24	0	0	24	10	0
OILS.						
Linseed .....ton	21	15	0	22	0	0
Cocoanut, Cochin	27	10	0	28	0	0
Ceylon	24	0	0	0	0	0
Palm, Lagos	26	0	0	0	0	0
Rapeseed, English pale	32	0	0	32	10	0
,, brown	31	0	0	0	0	0
Cottonseed, refined	27	0	0	28	5	0
Tallow and Oleine	21	0	0	40	0	0
Lubricating, U.S.	5	0	0	6	0	0
,, refined	7	0	0	13	0	0
TAR—Stockholm .....barrel	1	4	3	1	4	6
Archangel	0	15	9	0	16	0

TENDERS.

[Communications for insertion under this heading must reach us *not later than* 12 *Noon on Thursdays.*]

AVONMOUTH (near Bristol).—For tank foundations and timber jetty, for the West of England Petroleum Association. Mr. C. M. Jacobs, engineer, 88, Bishopsgate-street, London:—

A. J. Beaven, Bristol (accepted) ... £2,975 0 0

BATH.—For the erection of premises for boilers and machinery for new electric light works (as per Contract No. 1), and for building chimney-stack and setting range of boilers (Contract No. 2), for Mr. H. G. Massingham. Mr. F. W. Gardiner, architect, Barton-street, Bath Quantities supplied:—

	No. 1.	No. 2.
C. Wibley.....	£1,024 8 0	... £568 10 0
E. Chancellor	972 0 0	... 512 0 0
J. Long & Sons	950 0 0	... 520 0 0
Hayward & Wooster	964 19 0	... 495 10 0
J. Bladwell	900 0 0	... 525 0 0
T. Laver & Co.....	895 0 0	... 450 0 0
T. Morgan	1,120 0 0	—

BRIGHTON.—For erecting house at Rottingdean, near Brighton. Mr. William Buck, architect, Horsham:—

Pannett Bros., Horsham	£760 0 0
Rowland, Horsham.....	740 0 0
Cook, Crawley.....	649 0 0
Floyd, Lewes	600 0 0
Peters, Horsham.....	589 0 0
Wheatland, Handcross	544 0 0
Baker, Seaford.....	525 0 0
Taylor, Brighton.....	520 0 0
Jeal, Rottingdean (accepted)	515 0 0

COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

COMPETITIONS.

Nature of Work.	By whom Required.	Premium.	Designs to be delivered.	Page.
Proposed New Town Hall	Yeovil Corporation	.....	Oct. 25th	ii.
Municipal Buildings	Sheffield Corporation	600*l.*	Dec. 2nd	ii.

CONTRACTS.

Nature of Work, or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Cast-iron Water Mains	Tottenham Local Board	J. E. Worth	Sept. 17th	ii.
New Vestry Hall and Offices	St. Martin-in-the-Fields Vestry	R. Walker	Sept. 19th	xiv.
Works at Coalville, Bromsgrove, Ancoats, &c.	M. R. Co.	*Official*	do.	xii.
Sewerage Works	Croydon Land, &c., Co.	Blake, Haddoch, & Co.	Sept. 21st	xiv.
Purchase and Pulling-down Building Materials	School Bd. for London	*Official*	Sept. 23rd	xii.
Roadmaking and Paving Works	Willesden Local Board	O. Claude Robson	Sept. 24th	xiv.
New Works, Bristol Lunatic Asylum	Bristol, City of	H. Crisp & Oatley	do.	ii.
New Shop Front, &c., Paddington, &c.	London Dairy Co. Lim.	T. Mullett Ellis	Sept. 25th	xiv.
Broken Granite	North Walsham L. B.	*Official*	Sept. 26th	xiv.
Widening Bridge, &c.	Stockport County Boro'	A. M. Fowler	do.	xii.
Alterations to Shelter Hall, &c.	Brighton Town Council	G. R. Andrews	do.	xii.
Erection of Visitors' Room, Ashford School	West Lond. Sch. Dist.	*Official*	Sept. 27th	xii.
New Coastguard Station, Deal	Admiralty	do.	do.	ii.
Superstructure of Lunatic Asylum	London County Council	G. T. Hine	Sept. 28th	xii.
Enlargement of Lunatic Asylum, Coulsdon	do.	C. H. Howell	Sept. 30th	xii.
New Post-office, Barrow-in-Furness	Com. of H.M. Works	*Official*	do.	ii.
Sewerage and Sewage Disposal Works	Bingley Local Board	A. E. Preston	do.	ii.
Storage Reservoir, &c.	Yeadon Water Co.	do.	do.	ii.
Pipe Sewers, &c.	St. George U. S. A.	W. Cloutman	do.	xii.
Stores	G. W. R. Co.	*Official*	do.	xii.
Broken Granite, Granite Siftings, &c.	Dover Town Council	do.	Oct. 1st	xiv.
Waterworks	Market Harborough, &c., Local Board	J. B. Everard	do.	ii.
Erection of Baths, Plumbing Works, &c.	St. Helen's Corporation	G. J. C. Broom	Oct. 2nd	xiv.
Construction of Portion of Aqueduct	Manchester Corporation	G. H. Hill	Oct. 3rd	ii.
Re-construction of Viaduct, Cornwall	G. W. R. Co.	*Official*	Oct. 8th	xii.
Sewerage and Sewage Purification Works	Kingston R. S. A.	W. H. Hope	Oct. 9th	xii.
Construction of Reservoirs	Mountain Ash Loc. Bd.	J. Mansergh	Oct. 12th	xiv.
New School Buildings	Governors of Perse Sch., Cambridge	W. M. Fawcett	Not stated	xiv.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Inspector of New Buildings and Drains	Southport Corporation	2*l.* per week	Sept. 16th	xviii.
District Surveyors (3)	Lancashire C. C.	200*l.* each	Sept. 17th	xviii.
Clerk of Works	Market Harborough, &c., Local Board	3*l.* per week	Sept. 24th	xviii.
Borough Surveyor	Brighton Town Council	500*l.*	Sept. 25th	xviii.
Road Foreman	Handsworth Local Bd.	2*l.* per week	Not stated	xviii.

BRISTOL.—For alterations to Clifton Club. Mr. E. Henry Edwards, architect, Bristol:—
A. J. Beaven (accepted) £1,588 0 0
[Lowest of three invited tenders.]

CHADWELL HEATH (Essex).—For alterations and repairs to the "White Horse" public-house, Chadwell Heath, Essex, for Messrs. Ind, Coope, & Co., Limited. Mr. John Hudson, architect, 80, Leman-street, E.:—
Gladding, Mile-end £729 0 0
Barnes, Ilford 715 0 0
Death, Chadwell Heath 690 18 0
Hammond & Son, Romford (accepted) 668 0 0

CHILWORTH (Surrey).—For an addition to the old Manor House, Chilworth, Surrey. Mr. F. Hammond, architect, 1, Circus-place, London-wall:—
Dove Bros. £975 0 0
Etherington 939 0 0
Wood 928 0 0
Martin, Wells, & Co. 725 0 0

EDMONTON.—For bringing out front, and other alterations and repairs to the "William IV." public-house, Lower Edmonton, N., for Messrs. Furze & Co. Mr. John Hudson, architect, 80, Leman-street, E.C.:—
Wyman (amended tender*), Edmonton £550 0 0
* Accepted.

HORSHAM.—For building two shops, Horsham. Mr. William Buck, architect:—
Potter, Horsham £998 0 0
Pannett Bros., Horsham 950 0 0
Peters, Horsham 875 0 0
Rowland, Bros., Horsham 794 0 0
Shaw, Horsham 671 0 0
Pledge, East Grinstead (accepted) 657 0 0

ILKESTON.—For building Methodist New Connexion Chapel at Ilkeston, Derbyshire. Mr. A. H. Goodall, architect, Market-street, Nottingham. Quantities by the architect:—
J. Wainwright, Ilkeston £1,082 0 0
Chas. Moult, Stapleford 1,040 0 0
Emerson & Franks, Nottingham 1,024 17 0
W. Savage, Nottingham 1,020 0 0
W. Fletcher, Beeston 1,004 4 0
Thos. Cuthbert, Nottingham 978 10 0
John Manners, Ilkeston 966 0 0
John Cooper, Nottingham 964 0 0
G. Youngman, Long Eaton 953 0 0
Evans & Woodcock, Nottingham 949 0 0
J. Oscroft, Nottingham 922 12 8
B. Keeling, Nottingham 916 0 0
A. B. Clarke, Nottingham 900 0 0
F. Shaw & Son, Ilkeston (accepted) 867 0 0
J. Turton, Old Basford, Nottingham 854 0 0

IPSWICH.—For 70,000 memel wood-paving blocks, 9″ × 3″ × 4½″, delivered at Wolsey-street, Ipswich, for the Corporation*:—

	Per 1,000.
Acme Wood-paving Co., London	£6 0 0
Brunswick Rock Asphalte Co., London	6 0 0
Skelton & Co., London	5 13 6
Jewson & Son, Norwich	5 12 6
Sharp & Co., Sutton Bridge	5 12 6
English Brothers, Sutton Bridge	5 5 0
G. H. Bulbeck, Arundel (for beech blocks)	4 18 6
W. Brown & Co., Ipswich (accepted)	4 17 6

JOHANNESBURG (Transvaal).—For erecting a new Stock Exchange, for the Johannesburg Estate Company, Limited. Messrs. Lennox Canning and Fredk. G. Goad, C.E., architects, Johannesburg. Quantities by the architects:—

Portland Cement Concrete Foundations.

Isaac Royce	£6,887 0 0
Abrey & Co.	4,982 6 9
J. M. Cullinan	4,994 0 0
Light	4,600 0 0
A. L. Lawley (accepted)	4,575 0 0
McColl & Robertson	4,546 0 0

Superstructure.

McColl & Robertson	£39,346 0 0
Light	34,400 0 0
J. M. Cullinan	31,250 0 0
A. L. Lawley (accepted)	30,800 0 0
Abrey & Co.	30,549 0 0

[All of Johannesburg].

KIMBERLEY (Notts.)—For erecting seven houses at Kimberley, Notts. Mr. A. H. Goodall, architect, Market-street, Nottingham. Quantities by the architect:—
John Attenborrow, Nottingham £1,570 0 0
W. Fletcher, Beeston 1,443 1 6
Shaw & Brassington, Kimberley 1,430 0 0
J. Cooper, Nottingham 1,360 0 0
A. B. Clarke, Nottingham 1,350 0 0
Evans & Woodcock, Nottingham 1,345 0 0
H. Matthews, Kimberley 1,330 10 0
Barlow & Whittaker, Nottingham 1,315 0 0
Thos. Cuthbert, Nottingham 1,310 0 0
W. H. Simons, Nottingham 1,309 0 0
B. Keeling, Nottingham 1,250 0 0
J. Turton, Old Basford, Nottingham 1,250 0 0
J. A. Munks, Hucknall Torkard 1,240 0 0
J. Dove, Hucknall Torkard 1,235 0 0
W. Buxton, Kimberley 1,209 10 0
F. Shaw & Son, Ilkeston (accepted) 1,185 0 0

LONDON.—For building dwellings, Hereford-road, Bayswater, W. Mr. Arthur Young, architect:—
Nightingale £7,238 0 0
Patman & Fotheringham 7,149 0 0
Holland & Hannen 7,058 0 0
Dove Bros. 6,975 0 0
C. Wall 6,590 0 0
Stimpson 6,560 0 0
Burman 6,495 0 0
Scrivener 6,487 0 0
Kynoch 6,400 0 0
Lawrence 6,400 0 0
Allen & Sons 6,375 0 0
Johnson 6,270 0 0
Peto Bros. 5,893 0 0
Wm. Oldrey & Co. 5,724 0 0

LONDON.—For the erection of three dwelling-houses, &c., Nos. 54, 56, and 58, Rosslyn-street, Hampstead, for Mr. John Dudman. Mr. Chas. Bell, architect, 3, Salters' Hall-court, Cannon-street, E.C. Quantities supplied by Mr. H. Lovegrove:—
Ward & Lamble £6,197 0 0
Anley 5,880 0 0
Staines 5,777 0 0
Bowden 5,575 0 0
Wall 5,537 0 0
Green & Lee 5,393 0 0
Burford 5,385 0 0
Dearing & Son 5,377 0 0
Allen 4,950 0 0

LONDON.—For additions to No. 1, Granville-park, Blackheath, for Mr. H. Marriott. Mr. Leonard V. Hunt, architect, 35, Queen Victoria-street, E.C.:—
Wood, Greenwich £239 0 0
Kennard, Lewisham (accepted) 190 0 0

LONDON.—For erecting a house in Heath-street, Hampstead, for the Wells and Campden Charity Trustees. Mr. Henry S. Legg, architect, Christ's Hospital, London:—
Dove £2,175 0 0
King 1,975 0 0
Burford 1,935 0 0
Wall Bros. 1,875 0 0
Allen & Son 1,775 0 0

LONDON.—For alterations, &c., to the People's Hall, 272, Whitechapel-road, to convert same into a Cheap Food and Shelter Depôt for General Booth. Mr. J. Williams Dunford, architect, 101, Queen Victoria-street, London, E.C.:—
Corhead, Leytonstone £1,300 0 0
Doubleday, Kingsland 1,145 0 0
Martin, Battersea (accepted) 995 0 0

LONDON.—For alterations and repairs to No. 11, Agar-street, Strand, for Mr. H. J. Hairsine. Mr. John Job Wood, architect, 73, Castle-street, Battersea Park:—
Bulton £250 0 0
Hay & Son 165 0 0
Barker 163 15 0

LONDON.—For painting and repairs to eleven houses, Brady-street, E., for Mr. Chas. James. Mr. John Hudson, architect, 80, Leman-street, E.:—
Coulsell Bros., Bethnal-green £187 0 0
Howard, Bethnal-green 184 0 0
Eaton & Co., Whitechapel 178 0 0
Gladding, Mile-end 178 0 0

LONDON.—For the erection and completion of a new Postal Sorting Office, Seven Sisters'-road, South Tottenham, for the Commissioners of H.M. Works and Public Buildings. Mr. Henry Tanner, architect, 15, Whitehall-place, S.W.:—
Thomas Anthony, Brentford* £1,145 0 0
* Accepted.

LONDON.—For alterations and additions to factory, Graham-street, City-road, for Messrs. Carlisle & Clegg. Mr. T. H. Smith, architect, 17 and 18, Basinghall-street, E.C.:—
Tarrant £1,980 0 0
Turtle & Appleton 1,925 0 0
Lawrance & Son 1,835 0 0
Woodward & Co. (accepted) 1,810 0 0

LONDON.—For alterations to house and stables, No. 15, Lower Berkeley-street, Portman-square, W., for Mr. A. J. Blount. Mr. F. M. Elgood, architect, 98, Wimpole-street, W.:—
Bartholomew & Co. £1,108 0 0
Clarke & Mannooch 849 0 0
Simpson & Son 847 0 0
Geo. Shaw (accepted) 750 0 0

LONDON.—For the erection of Free Methodist church, Markhouse-road, Walthamstow. Mr. E. C. Homer, architect, 99, Gresham-street, E.C.:—
Wagstaff & Sons £2,296 0 0
Stains & Sons 2,089 0 0
Grover & Sons 1,895 0 0
Chessum & Sons 1,875 0 0
Green & Lee 1,850 0 0

LONDON.—For the erection of new premises, 394 and 396, Euston-road, N.W., for Mr. E. M. Reilly. Mr. A. Frampton, architect, 62 and 63, Basinghall-street, E.C.:—
H. Cooper £4,841 0 0
W. Titmas & Sons 4,411 0 0
W. Scrivenor 4,144 0 0
A. & W. Garnar, Peckham 3,770 0 0

LONDON.—For alterations and repairs to No. 128, Harley-street, W., for Mrs. Alexander. Mr. F. M. Elgood, architect, 98, Wimpole-street, W.:—
Clarke & Mannooch (accepted) £731 10 0

LONDON.—For erecting new vestries at St. Andrew's Church, Bethune-road, Stoke Newington. Sir Arthur Blomfield, A.R.A., architect. Quantities not supplied:—
J. M. Macey & Sons £649 0 0
John Coldwells & Son 600 0 0
Dove Bros. 585 0 0
J. Chessum & Sons 425 0 0

SURBITON.—For building new house at Surbiton, for Mr. Ninian Crawford. Mr. Wm. Kidner, architect, 23, Old Broad-street, E.C. Quantities by Mr. James Barnett, 90, Cannon-street, E.C. :—

J. F. Collinson, Teddington	£3,980	0	0
Robt. Aviss & Co., Putney	3,875	0	0
C. Oldridge & Sons, Norbiton	3,773	0	0
Adkins Bros., Surbiton	3,667	0	0
J. H. Jarvis, East Molesey	3,665	0	0
C. & T. Adkins, Surbiton	3,600	0	0
S. J. Scott, London	3,587	0	0
Turtle & Appleton, Clapham	3,585	0	0
Watson, Ascot	3,490	0	0

SUTTON.—For additions to "Worcester House," Sutton, Surrey, for Mr. J. J. Holford. Mr. Frederick Colyer, architect, 18, Great George-street, Westminster:—

Balchin & Shopland, Sutton*	£357	0	0

* Accepted.

UPTON-PARK.—For the erection of house and shop, in Park-road, Upton-park, with stable and coachhouse, and putting new shop-front to adjoining house, for Messrs. H. W. Hopwood & Son. Mr. John Hudson, architect, 80, Leman-street, E. :—

T. Little, Whitechapel	£897	0	0
J. & H. Cocks, Mile-end	762	0	0
Coulsell Bros., Bethnal-green	729	0	0
W. Gladding, Mile-end	728	0	0
A. Eaton & Co., Whitechapel	719	0	0
Bush & Son, Upton	650	0	0
J. W. Wyles, Upton (accepted)	620	0	0

WOLVERTON (Bucks).—For additions to envelope works, Wolverton, for Messrs. McCorquodale & Co., Limited. Mr. H. Phelps Drew, architect, 99, Gloucester-road, London, S.W. Quantities by the architect :—

Miskin, St. Albans	£1,841	0	0
Norton, Chelsea	1,579	0	0
Worrall, Wolverton	1,556	0	0
Robinson, Bradwell (accepted)	1,517	0	0

WORKSOP.—For building new maltings, foreman's house, entrance-gates, and boundary-walls, &c., for Mr. Wm. Stones. Mr. E. W. Farebrother, architect, Grimsby :—

Jno. Rollett & Son, Worksop	£17,547	0	0
James Harrison, Worksop	14,150	0	0
Ilett & Sons, Worksop	13,250	0	0
John Wilson, West Retford	13,160	0	0
Wm. Storey & Son, Bourne, Lincolnshire	12,985	16	8
John Chambers & Sons, Sheffield	12,889	0	0
Joseph Guy & Co., Grimsby	12,658	10	0
Thomas Lowe & Sons, Burton-on-Trent	12,350	0	0
Enoch Hind, Nottingham	12,347	0	0
Wm. Holden & Co., Stalybridge	12,260	0	0
James White, Sheffield	12,200	0	0
John Greenwood, Mansfield	12,198	0	0
Geo. Longden & Son, Neepsend, Sheffield	11,800	0	0
John Lister, Aston, Rotherham	11,781	10	0
Evans & Woodcock, Nottingham	11,779	0	0
N. Vickers, Nottingham (accepted)	11,650	0	0

Alterations at the "Pegasus Tavern."—Mr. W. Evans, of Upper Holloway, writes to complain that his tender was placed at the top of the list for this job. He says that, in point of fact, he was third down on the list. He says his tenders were:—For alterations, &c., 1,188*l.*; for billiard-room, 695*l.*, making a total 1,883*l.* We inserted the list as we received it.

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et cognoscit Eum
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diligit
Sæcula
verbo Dei
intelligimus
optata esse
Fide
Si quod non
videmus
speramus
patienter
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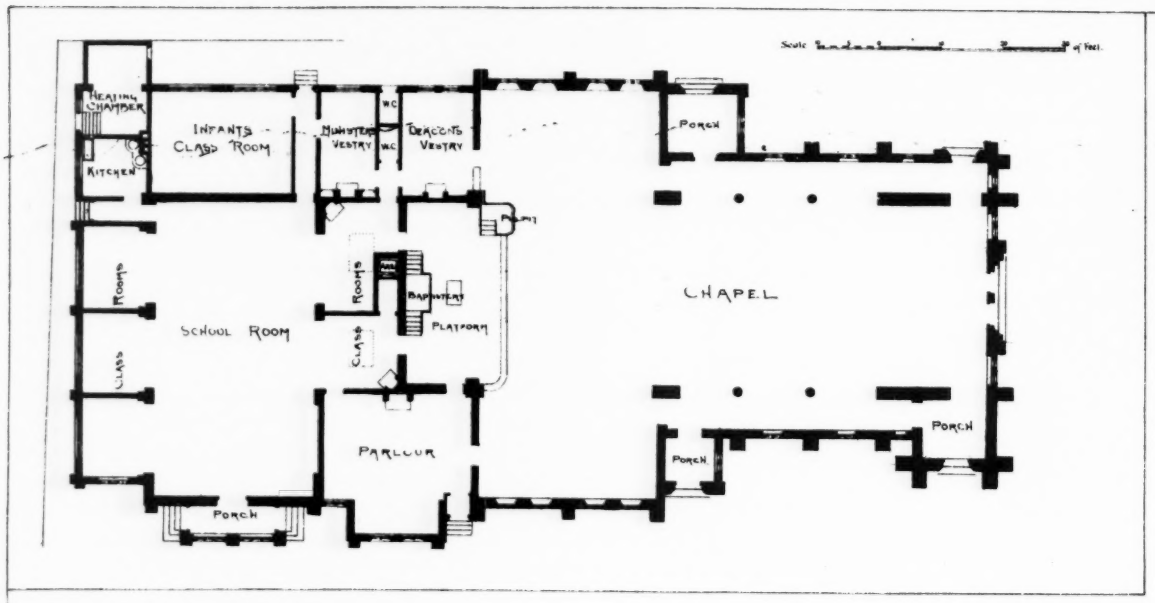

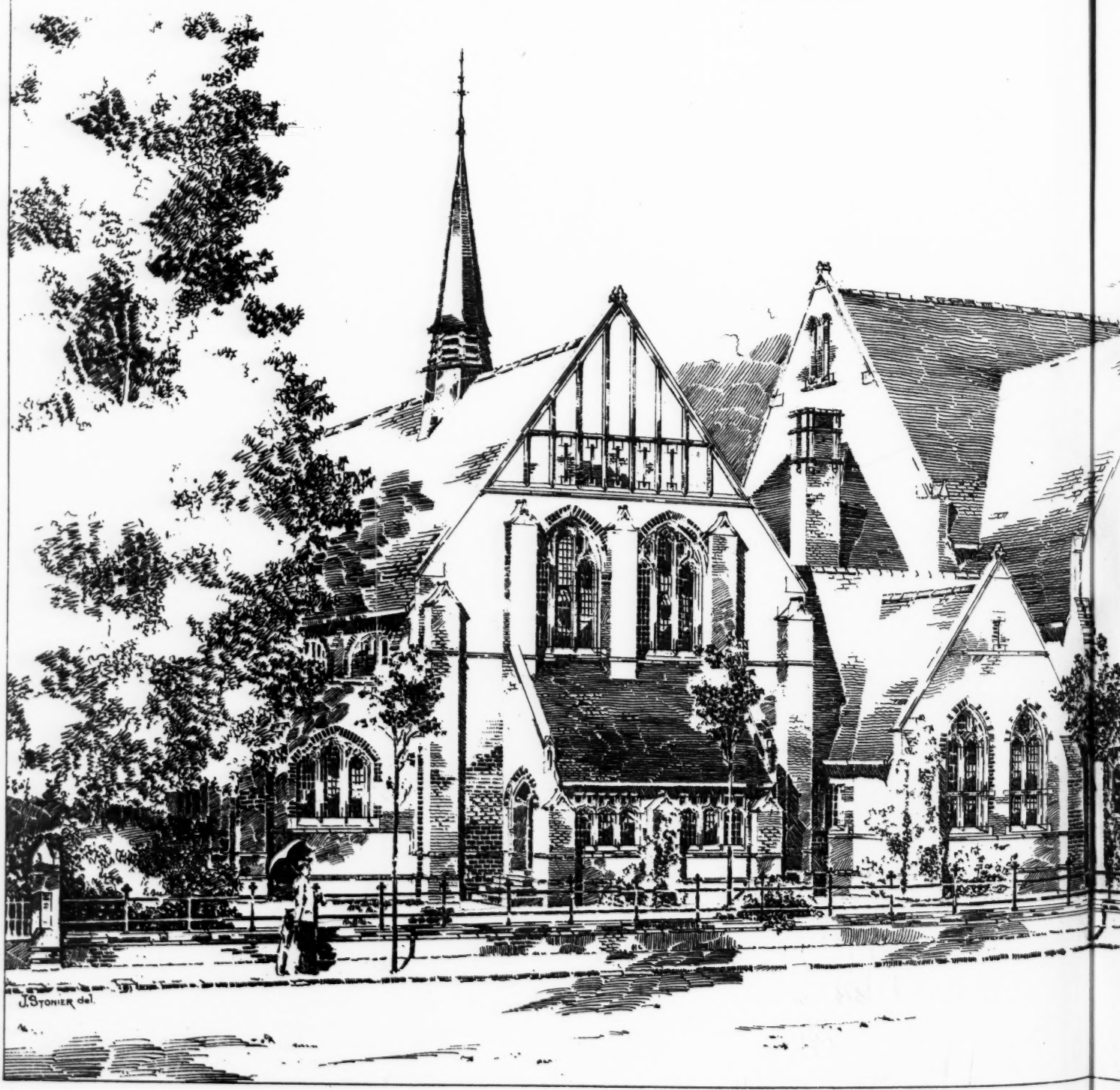

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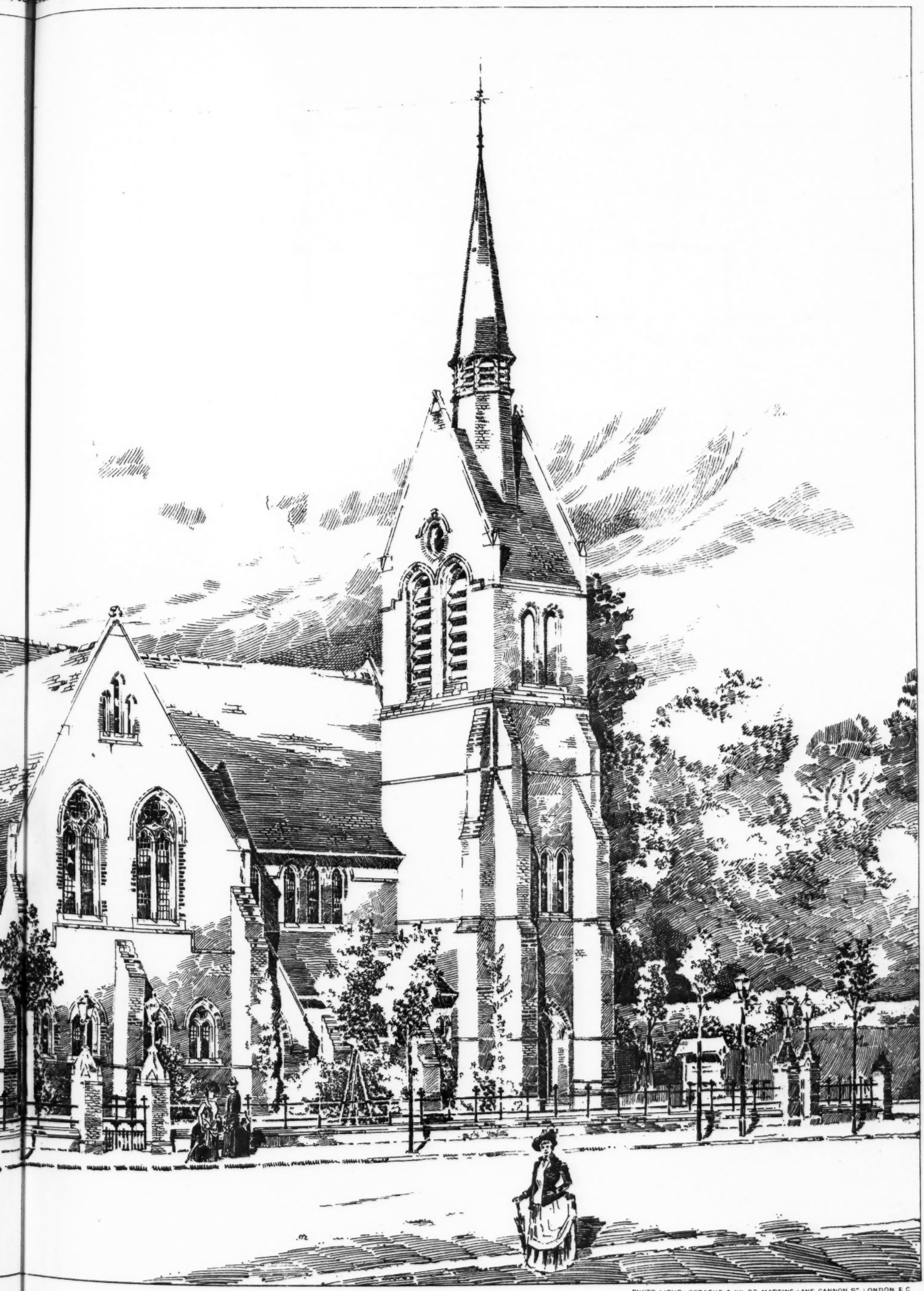

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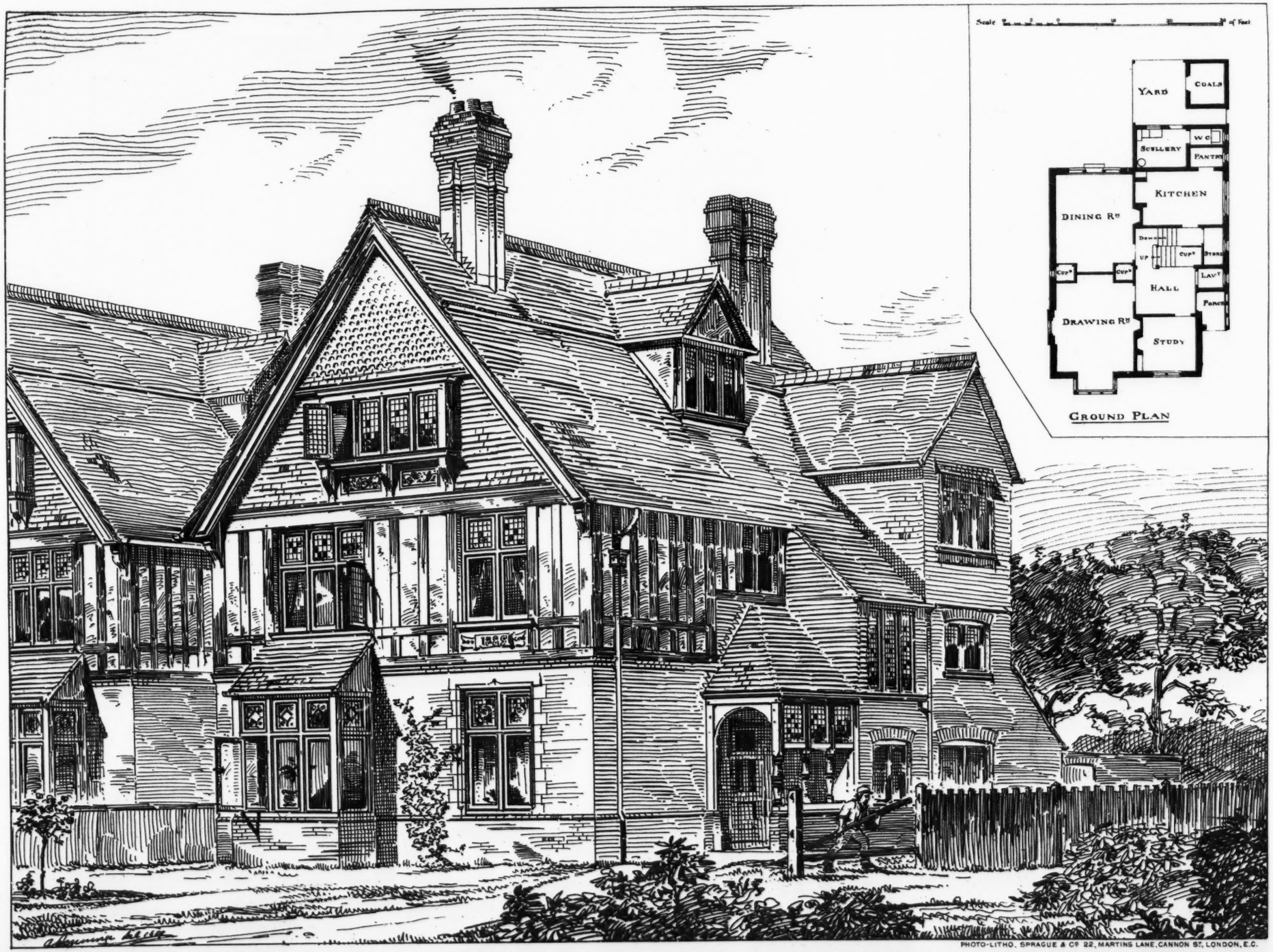

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